AVIATION WEEK

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A "FOLLOW THROUGH" THAT REACHES AROUND THE WORLD

It's always seemed to us that making a good product and getting it into airplanes represents only about half of a manufacturer's responsibility.

What's needed after that to make the job complete is a thorough "follow through" *in the field*—where the airplanes actually see service.

That's why in the Honeywell organization we have a group of carefully selected Service Engineers. They're stationed around the world, as these on-the-spot photos indicate.

Their job is to trouble-shoot and flight-test Honeywell controls—Autopilots, Engine Controls, Electronic Fuel Gauges, Gyros and other control equipment—in dozens of different kinds of aircraft. And their job, too, is to help train Air Force, Navy and airline crews in maintenance of their control equipment, as well as to recommend design changes and figure new ways to meet new control problems.

We expect our staff of Service Engineers to grow larger in future years. Because *automatic control* is so important a part of aviation progress. And *automatic control* is Honeywell's business.

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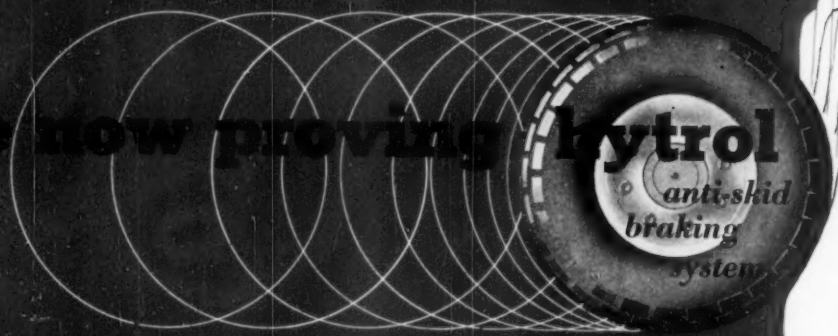

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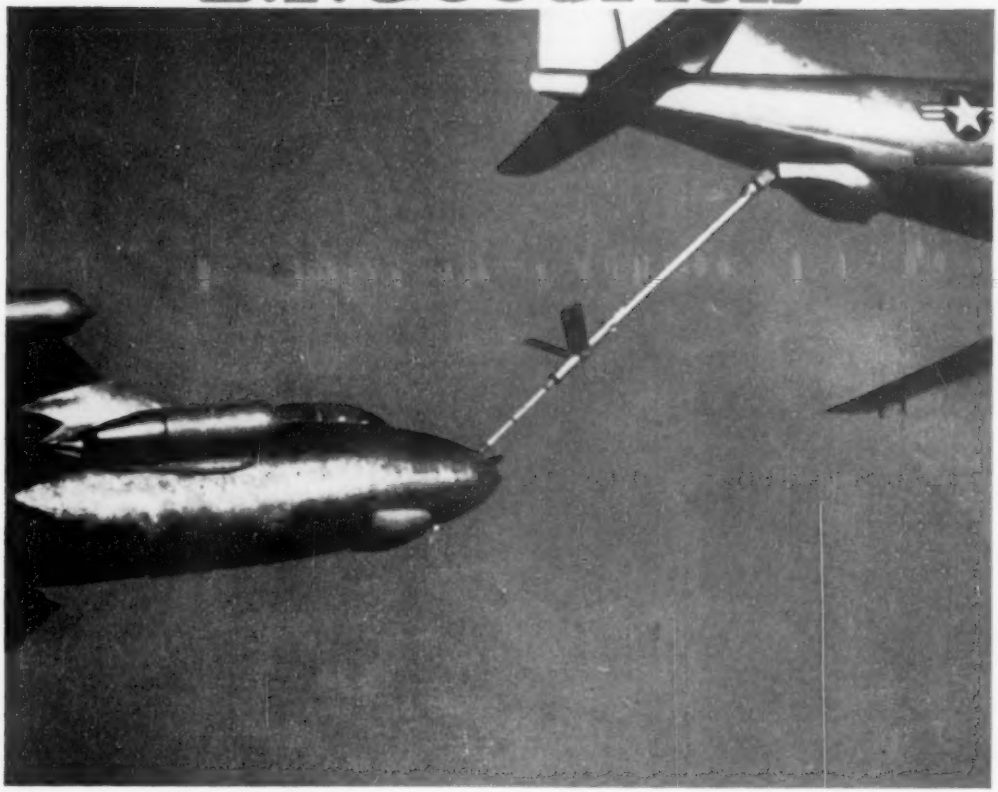


Rubber keeps ice out so flying boom can come in

WHEN the Flying Boom—Boeing's telescoping tube for mid-air refueling—delivers fuel to a plane in flight, it fits into a special opening in the receiving ship called an in-flight fueling receptacle.

In designing the receptacle, Boeing engineers faced a problem: if icing conditions while in flight should cause ice to form in the receptacle, it would choke up the opening, make it impossible for the boom to enter. Looking for the best way of keeping ice from forming, Boeing brought the problem to B. F. Goodrich.

It seemed like a job for electrically-heated rubber—thin, tough rubber heated by a core of electric resistance wires. But to put the heat where needed, the heated rubber would have to blanket most of the receptacle area—fit snugly over bulges, around complicated curves and corners. It was a tricky job.

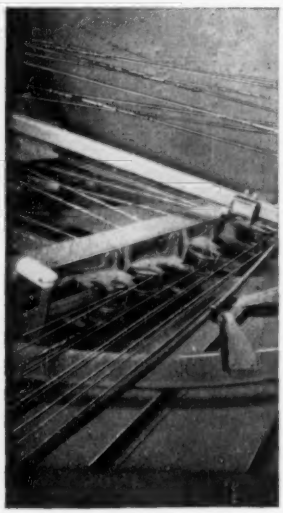
B. F. Goodrich formed heated rubber into twelve molded sections which would fit together skin-tight over the contours of the receptacle. Put to the test, the sectional construction proved to be the answer. And heated rubber is now used on re-fueling receptacles for the B-47.

B. F. Goodrich heated rubber is a highly efficient way of providing spot anti-icing heat. It is flexible, saves weight, fits curves. Besides re-fueling receptacles, BFG heated rubber is doing a successful job on propellers, control surfaces, wings, air scoops, many other parts. It is a typical development of the BFG engineering and research that supplies aviation with the answers to tough problems. B. F. Goodrich products for aviation now include tires, wheels and brakes; heated rubber; De-Icers; pressure-sealing zippers; Avtrim; inflatable seals; fuel cells; accessories; Rivnuts. *The B. F. Goodrich Company, Aeronautical Division, Akron, Ohio.*

B.F.Goodrich
FIRST IN RUBBER

AIRCRAFT CONTROLS

There's almost no "constructional stretch" in Roebling Aircord



BEYOND MEETING today's most stringent specifications, Roebling Preformed Aircord for controls contains practically no troublesome and unpredictable "constructional stretch." For this reason, Roebling Aircord always affords maximum uniformity of control and minimizes the need for periodic take-ups.

Roebling Preformed Aircord, made of steel or of stainless steel, comes in a full range of sizes and can be furnished in complete assemblies with swaged terminals that possess the full strength of the cord itself.

Write for complete information about Aircord and other test- and time-proven Roebling aircraft products. And call on Roebling's engineering staff for any desired suggestions and assistance. John A. Roebling's Sons Company, Trenton 2, New Jersey.

Branches and warehouses in principal cities.

ROEBLING

Aviation Week

ABP Member ABC

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RESISTANCE WELDING HIGH-TEMPERATURE ALLOYS?

General Electric can help you in the proper selection of resistance welding control—single-phase and three-phase

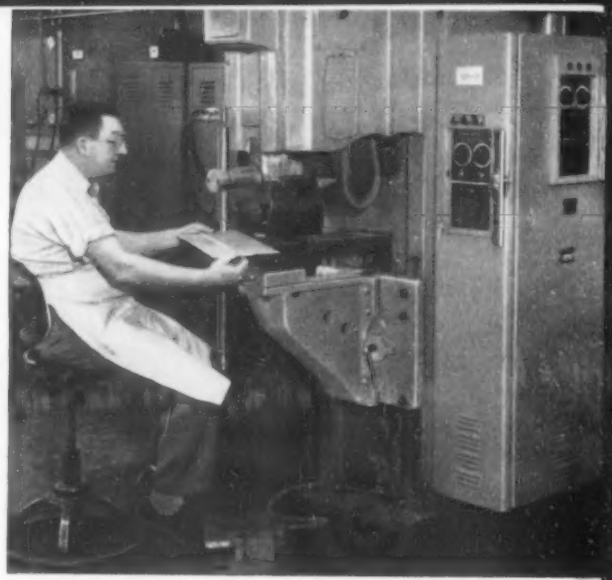
Are you faced with resistance welding high-temperature, high-strength alloys or aluminum for defense production? Trying to decide between three-phase and single-phase welding control? Write for G-E literature that describes both types. We know, from experience in our own as well as customers' plants, that both are being used. Which *you* select will depend to a great extent on these factors:

COMPARE SINGLE-PHASE AND THREE-PHASE

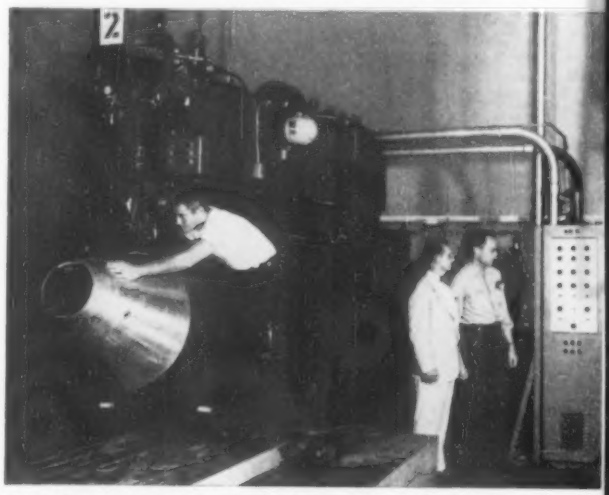
Single-phase	Three-phase
1. Low initial cost	1. Low KVA demand
2. Low maintenance (easy)	2. Balanced 3-phase load
3. Simple to operate (few adjustments)	3. High power factor
4. Wide industry use	4. Inherent slope control action
5. Voltage and current regulators can be added later	
6. Slope control can be added if necessary	

General Electric has supplied, and used, both types to meet Army-Navy specifications, and our nearest local office can give you information based on experience with this equipment and with welding high-strength alloys. Before you buy—investigate. Contact the nearest G-E sales office or write for Bulletin GED-1512 to Section A645-55, *General Electric Co., Schenectady, N.Y.*

Ask your resistance welding manufacturer, power supplier, or nearest General Electric office for a FREE showing of the sound and color movie, "This Is Resistance Welding." Describes various welding methods and processes. For production and engineering personnel training and refresher courses.



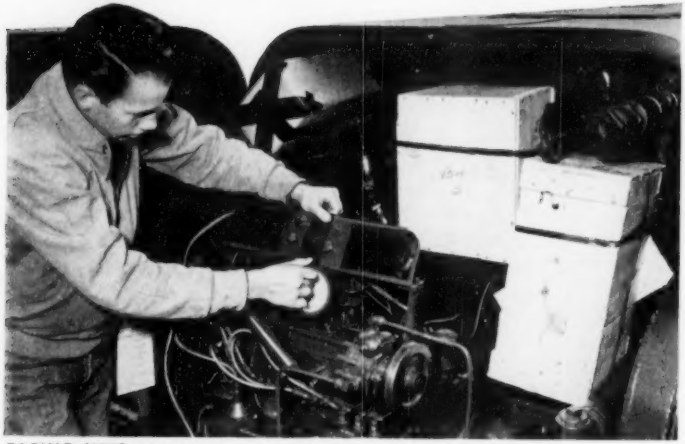
H. C. Wolfe, of the General Electric Electronics Laboratory Welding Section, says, "Tests in our Laboratory and in other General Electric Welding Laboratories showed that single-phase a-c welding using Slope Control was as good as three-phase welding on aluminum. So, for Class A spot welding of aluminum, the use of our a-c machine with Slope Control certified to Military Specification MIL-W-6860 for .125-.125" 52S$^{1}_{4}$H aluminum has resulted in a considerable saving of money and time."



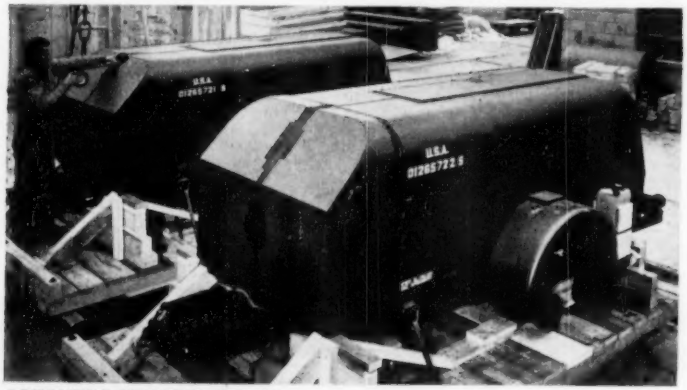
Three-phase at Ryan Aeronautical Company in San Diego controls several of the largest resistance welding machines in the country. With G-E 3-phase control exact heat settings can be obtained and duplicated later without variation. Uniform current is fed to the electrodes to produce the required heat with less momentary line load. Unidirectional spot-welding is also obtained—advantageous when welding sheets of different thicknesses.

GENERAL ELECTRIC

GOV'T SPEC
specialist relies on Polyken



TAPING SHUT the ignition key slot on the Army's mobile shower unit. Worker uses Polyken Tape No. 214. You can see where he's already sealed a packaged fire extinguisher (upper left), a valve outlet (upper right), as well as the instrument panel which he is just completing.



COMPLYING WITH GOV'T SPECS, these army mobile shower trailer units are sealed with Polyken No. 214, ready for overseas shipment.

How to meet Government Specification JAN-P-127- Amend 3 safely, economically

Packaging and crating for Gov't Spec and export is the business of August G. Barkow Co., Milwaukee. They rely on Polyken Industrial Tapes—made by the company that makes 30 tapes meeting Government Specification JAN-P-127-Amend 3.

For example, on U. S. Army mobile shower units, manufactured by Cleaver-Brooks Co., Barkow uses Polyken No. 214 to seal all openings—seams, pipes, hoses, and tool kits—against dirt, dust, moisture and rust.

Polyken No. 214, used here, is black. Also available in nine other colors—all conforming to the same Government Specification—all equally fast, sure, economical.

These 30 tapes represent only a small part of our full line of "tapes that do things you never thought tape could do." Send in coupon for free samples and booklet.

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For specifications, samples, and further information on No. 214 and other Polyken tapes, please send me your *FREE BOOKLET*, "Tape is a Tool."

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NEWS DIGEST

DOMESTIC

Douglas DC-6B gross takeoff weight has been raised to 107,000 lb. from 100,000 lb. with CAA approval. Nearly all the increased weight allowance will be used for fuel. Pan American World Airways will get the first 107,000-lb. configuration.

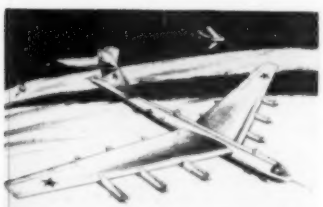
First F-86F Sabre has been delivered to USAF by North American Aviation. This new model features the more powerful 5,800-lb.-plus-thrust J47-GE-27 turbojet, also has the hydraulically controlled all-movable horizontal tail.

U. S. civil aircraft exports during February totaled 23 units of 6,000 lb. and less worth $206,986.

Brig. Gen. Jesse D. Auton, Deputy Director of Operations for Fighters, Strategic Air Command, and his aide, Lt. Col. Edwin R. Bush, were killed Mar. 31 when their B-25 crashed while attempting to land at Offutt AFB, Omaha.

Wright Aeronautical division and CIO-UAW Local 669 have agreed on a new contract providing a 12-cent-an-hour increase for 16,000 workers. The union struck two Wright plants in New Jersey for three weeks last September, but returned to work when President Truman referred the dispute to WSB.

Boeing-Wichita and IAM Local 70 have agreed on a five-cent cost of living increase retroactive to Nov. 6, 1951, through Apr. 15. New agreement, which extends through Mar. 31, 1953, includes program for conversion from Wichita's rate range structure to the Seattle division job evaluation plan and single rate structure.



PURPORTED RUSSIAN BOMBER of intercontinental range was featured last week in house organ of Boeing Airplane Co. Sketch and data were furnished Boeing by an artist and a writer in England who based their material on indirect information allegedly from behind the Iron Curtain. Boeing says it cannot vouch for details, or prove the bomber exists. Other observers are even more skeptical.

FINANCIAL

American Airlines' net income for 1951 totaled $10,548,682 after taxes, revenues being $162,971,000. The company paid $3.50 in dividends on its $100 par value preferred stock during the year and two 25-cent dividends per share of common.

Trans World Airlines earned $8,511,000 last year after paying $8,888,000 income taxes. Total operating revenues were up 23.9% over the previous year, being $144,912,000.

Colonial Airlines had $76,553 net profit during 1951 compared with 1950's loss of $310,921.

Mid-Continent Airlines reports a $30,335 net loss for January after adjustment for income taxes. Operating revenues totaled $781,810 for the month.

Jack & Heintz, Inc., Cleveland, has declared 15-cent dividend per common share and a regular quarterly dividend of 50 cents per share of cumulative preferred stock, 4% series ($50 par value). Former payment will be made May 1 to holders of record on Apr. 15; shareholders of the preferred stock will be paid July 1 for stock recorded on June 20.

Electric Boat Co.'s consolidated net income in 1951 totaled $3,572,203 on net sales of $82,638,055. Company's backlog on Feb. 29 was $333,700,000. Ebco has formed General Atomic Corp. to work on industrial applications of nuclear fission.

The Sperry Corp., N. Y., notes consolidated net income of $10,883,161 for 1951 on shipments of $240,933,677. Backlog at the end of February totaled $631 million.

INTERNATIONAL

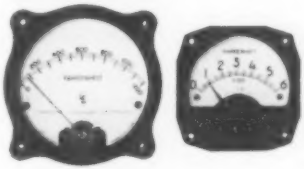
First production DH Heron four-engine transport has made its initial flight and is shortly to be flown to New Zealand for use as a demonstrator. DH recently received a contract for 14 Herons from Garuda Indonesian Airways. The British Air Registration Board has recently approved extension of DH Gipsy Queen 70-4 overhaul life from 600 to 800 hours.

LEWIS
Indicating Pyrometers

for temperature testing in the laboratory or in the plane...

Constructed with the same care as our aircraft temperature indicators, these pyrometers bring "aircraft quality" to the test engineer.

MODEL 58PY, above, has been used extensively by leading motor car manufacturers for road testing on the "Proving Grounds" — where performance counts. Housed in rectangular bakelite case, has 6" hand drawn scale and is fully compensated for ambient temperature. Made in ranges listed below, with suitable thermocouple materials.



MODEL 23B, left above, has same type movement as our aircraft pyrometers. Housed in flanged, 4" round, bakelite case for panel mounting.

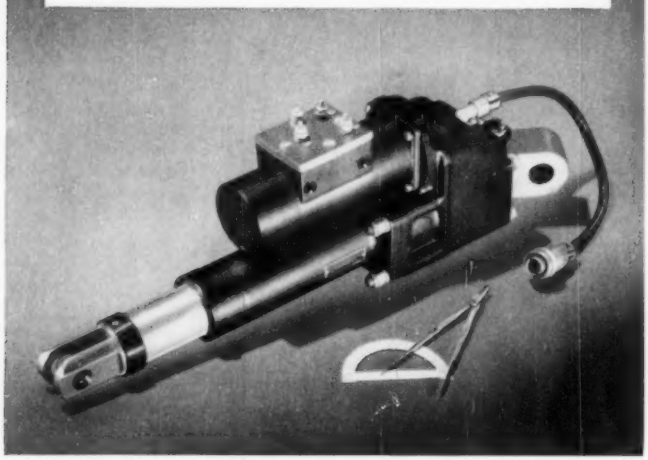
MODEL 20B, right above, has same 3" steel case and same movement as our aircraft panel indicators. Both are fully cold-end compensated and available in standard ranges listed, with suitable thermocouple materials.

STANDARD RANGES—All Models
FAHRENHEIT
Zero to 400, 600, 800, 1000, 1200, 1600, 1800, 2000 and 2500.
CENTIGRADE
Zero to 200, 300, 400, 500, 600, 800, 1000, 1100 and 1400.

Furnished with white scales, black markings and pointer or, with black scales white markings and pointer if specified. For best results use LEWIS Thermocouples, Leads and Selector Switches with these instruments.

THE LEWIS ENGINEERING CO.
Manufacturers of Complete Temperature Measuring Systems for Aircraft
NAUGATUCK, CONNECTICUT

Our largest *Lineator*®
has 10,000 lb. working capacity



Although the R-502 LINEATOR—our largest electric linear actuator—weighs less than 22 pounds for a 6-inch stroke, it has a working capacity of 5 tons maximum and an ultimate static capacity of 10 tons.

Speeds—at 10,000 pounds load—are from 10 to 25 feet per minute, depending on the motor and gearing. The R-502 has nonjamming internal positive stops and adjustable limit switches which operate through external relays.

Dimensions and performance data—with maximum power motor—on R-502 and other Airborne Lineators are given in the I.A.S. Aeronautical Engineering Catalog.

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AVIATION CALENDAR

Apr. 9-11—Society of the Plastics Industry seventh annual technical session, reinforced plastics division, Edgewater Beach Hotel, Chicago.

Apr. 15-17—American Institute of Electrical Engineers southwest district meeting, Hotel Jefferson, St. Louis; aviation papers Apr. 15-16.

Apr. 15-18—International Federation of Airline Pilots' Assns. annual convention, Sydney, Australia.

Apr. 21-24—National Aeronautics Meeting and Aircraft Engineering Display, Society of Automotive Engineers, Hotel Statler, New York.

Apr. 22—Institute of the Aeronautical Sciences meeting, Cleveland-Akron section, Cleveland.

Apr. 28—International Air Transport Assn. Warsaw Convention special committee meeting, Bermuda.

Apr. 30-May 2—American Institute of Electrical Engineers northeastern district meeting, Arlington Hotel, Binghamton, N. Y.; aviation papers Apr. 30.

May 2-4—Sixth annual Intercollegiate Air Meet, Great Barrington, Mass.

May 5-7—Symposium, "Progress in Quality Electronic Components," sponsored by Institute of Radio Engineers, American Institute of Electrical Engineers, and Radio & Television Manufacturers Assn.; technical sessions at Dept. of Interior auditorium; registration at Roger Smith Hotel, Washington, D. C.

May 5-16—International Air Transport Assn. technical conference meeting, Copenhagen.

May 8-9—Fifth annual Wisconsin Aeronautics Conference, Hotel Northland, Green Bay.

May 11—International Air Transport Assn. traffic committee meeting, Buenos Aires.

May 12-14—National conference on airborne electronics, co-sponsored by Institute of Radio Engineers' Dayton section and Professional Group on Airborne Electronics, Dayton Biltmore Hotel, Dayton, Ohio.

May 15-16—American Helicopter Society annual forum and banquet, Hotel Washington, Washington, D. C.

May 17-18—National Pilots Air Meet and Races, Chattanooga.

May 19—International Air Transport Assn. technical committee and medical committee meeting, Copenhagen.

June 9-13—National Fire Protection Assn. annual meeting; aviation seminar on June 10; Hotel Statler, New York.

June 19-21—American Society of Mechanical Engineers symposium on shock and vibration instrumentation, Pennsylvania State College, Pa.

PICTURE CREDITS

7—Boeing; 13—Sikorsky; 16—Republic Aircraft Corp.; 18—McGraw-Hill World News; 25—(bottom) McGraw-Hill World News; 39—Solar Aircraft Corp.; 50, 53, 54—Pan American World Airways; 68—McGraw-Hill World News; 70—BuAer.

Washington Roundup

New Key West Conference?

Congressional pressure is being put on the Pentagon to hold another Key West conference to re-work strategic policy and re-assign missions of the services in the light of present conditions..

The reason: Congressmen feel the services are building up in all directions, missions are overlapping, effort is being needlessly duplicated–at the taxpayers' expense.

Rep. Errett Scrivner, member of House Appropriations Committee, commented: "It would appear another Key West conference is due. Since so many changes have taken place in technological progress and in situations throughout the world, such as the advent of the Korean War, it might be well to go back and check previous decisions and see whether some other changes might not now be in order."

Naval aviation is back of the proposal.

It was from the 1948 Key West strategic plan, contemplating a direct U. S.-Russian war, that Air Force emerged as the dominant service.

Who's Wrong: USAF or Navy?

Public statements indicate that USAF and Naval Air aren't even agreed on points of fact.

Vice Adm. John Cassady, Deputy Chief of Naval Operations for Air: "We can deliver an A-bomb from a carrier. . . . The beauty of it is that the aircraft carrying the A-bomb can go in with a complete jet-fighter escort, all the way to and from the target."

Undersecretary of Air Roswell Gilpatric: "The B-36 bomber is what stands . . . between this country today and an attack by Russia. Of the planes that we have today, it alone has the capability to deliver atomic bombs on Russian targets."

Cassady elaborated to the House Appropriations Committee: "In air-to-ground offensive capability, the small atomic weapons have opened unlimited possibilities to naval aviation. There are many targets against which the small bomb is the preferable weapon. . . . All Naval attack aircraft and long-range fighter aircraft for which we (will be letting contracts over the coming year) will be able to deliver the small atomic bombs. Moreover, we have modified a sizable number of our fighter and attack planes already built and building to achieve the same capability.

"Despite the remarkable offensive strength that the small A-weapon gives to Naval aviation, we have not ignored the fact that some specific targets may be dealt with better by the large bomb. We now have in our carriers an attack plane capable of delivering the big bomb. A greatly improved carrier-based attack plane is in production."

Gilpatric explained to the same committee: USAF must continue buying B-36s over the coming year for delivery through August, 1954, because it will be over two and a half years before its other bombers capable of delivering atomic attack–the B-47, B-60 and/or B-52–will be in service operations.

Finletter: Abolish Public Relations

Secretary for Air Thomas Finletter would cut off direct relations between USAF and the press. His proposal: Let USAF present information to Congress, and Congress present it to the public–through the press or otherwise.

His comment: "The policy is to the maximum extent possible to bring out information that we want to bring out through presentation of the problem to Congress. We would like to see Congress take over more of this function of asking us the questions and getting the answers from us and then giving them to the public."

His suggestion to House Appropriations Committee: "Cut out all funds for military public relations staffs."

Finletter slashed USAF's PR staff at the Pentagon from 86 to 47 when he pulled it from Chief of Staff Gen. Hoyt Vandenberg a few weeks back and put it under his control.

Some observers expect it to set off widespread "leaking" of USAF-slanted stories to favored news outlets by military men who want their service publicized.

Big-Scale Plane Buying

Prospect is that Air Force and Naval aviation will be able to start contract letting on the coming-year aircraft procurement program promptly at the start of the fiscal year, July 1.

It'll be the first time in recent years that it has been possible. Last year their budgets weren't approved by Congress until mid-October.

But House Appropriations Committee already has completed hearings on requests. Last year, it was late September before hearings were over.

Railroads' Lost Friend

Railroad interests have stopped back-patting the nonskeds for operating without government support and bucking subsidization of the scheduled airlines.

Nonsked spokesman Amos Heacock, president of Air Coach Transport Assn. urged House Appropriations Committee to approve $1.4 million–which Civil Aeronautics Administration plans to use for testing jets for passenger transport operation.

He had a "but," though: that the Committee first obtain "binding" assurance that some of the money would be diverted to cargo plane testing and that ACTA members would be eligible for testing contracts.

Heacock threw to the winds this advice of Civil Aeronautics Board Member Joseph Adams: Instead of taking a narrow view, nonskeds now should support the passenger jet testing program–and pave the way for a cargo testing program later–in the interests of over-all aviation development.

The result: Both the skeds and nonskeds lost out. The Committee turned down the $1.4 million request.

Less for Air Safety

Civil Aeronautics Administration wants more money for general operations for the coming year, which starts July 1–but plans to earmark less for aviation safety than this year.

- Out of the $107 million CAA has for salaries and expenses for the current 1952 fiscal year, $11.8 million is allocated to "aviation safety."
- But out of the $110 million CAA is asking for next year, only $11.7 is for aviation safety.

–Katherine Johnsen

When it "Points" the Enemy suffers

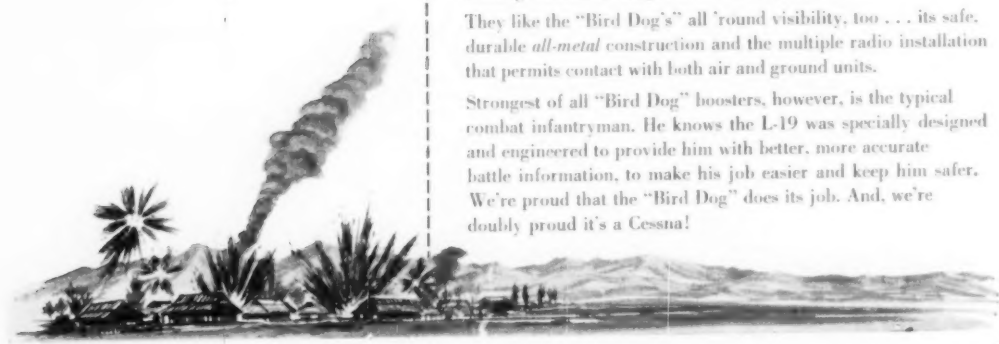
it's the *Cessna L-19 Birddog*

Roaming over hostile trenches . . . "calling in" deadly air and ground fire . . . finding and supplying cut-off GI units—it's all in a day's work for the rugged Cessna "Bird Dog." On duty in combat six to ten hours every day, this flexible L-19 observer has proved itself tops for "flushing" enemy troops.

It's tops with U. S. Army and Marine pilots, too! They praise the "Bird Dog's" powerful 213 horsepower engine, the Cessna patented landing gear and high lift flaps that permit take-offs and landings in short, rough fields never before usable!

They like the "Bird Dog's" all 'round visibility, too . . . its safe, durable *all-metal* construction and the multiple radio installation that permits contact with both air and ground units.

Strongest of all "Bird Dog" boosters, however, is the typical combat infantryman. He knows the L-19 was specially designed and engineered to provide him with better, more accurate battle information, to make his job easier and keep him safer. We're proud that the "Bird Dog" does its job. And, we're doubly proud it's a Cessna!



WHO'S WHERE

In the Front Office

David F. Devine, formerly of Bell Aircraft Corp., has joined Arma Corp., New York, as a vice president and will direct the firm's newly formed Financial division. Devine is a director of the Aero Club of Buffalo.

Rear Adm. Clyde W. Smith, USN, (Ret.), has been appointed assistant to the president of Kollsman Instrument Corp., Elmhurst, N. Y. Smith was formerly director of the Airborne Equipment division in charge of materials and equipment for BuAer, Washington, D. C. He is a graduate of Annapolis, class of 1919.

What They're Doing

Alfred M. Hudson, formerly with Colonial Airlines, has joined David E. Green Associates, public relations counsel whose headquarters are in New York.

T. W. Focke has resigned as manager of the Wright Aeronautical division.

Changes

Donald G. Fink, editor of Electronics magazine since 1946, is leaving the McGraw-Hill Publishing Co., to join Philco Corp. on June 1 as co-director of research and operations.

Robert B. Hicks, formerly president of the Ainsley Corp., Campbell, Calif., has been appointed manager of Pacific Airmotive Corp.'s Commercial Aircraft division. PAC is located at Burbank.

Joseph C. Towle, formerly chief pilot for Lockheed Aircraft Corp., has been designated director of flying operations. His department, in addition to flight testing, also encompasses two new departments: radio operations, and flight engineering and flight operations training. New Lockheed chief pilots who have been named are **Carl B. Patton** and **Carl Setili.**

Charles J. Burns has been appointed comptroller of Revere Corp. of America, Wallingford, Conn.

A. E. Merrill, acting chief of flight test for Boeing-Seattle, has been transferred to the Wichita division as chief of flight test. **John B. Fornasero** returns to Seattle to take over as chief of flight test. Merrill joined Boeing in 1941, has flown the B-17, 314 Clipper, PBB-1 Sea Ranger, XB-29 and XC-97. Fornasero joined the company in 1944, tested the B-17, B-29, B-47, B-50 and C-97.

John L. Senior, Jr., has been elected chairman of the board of New York Airways, Inc., and **Robert L. Cummings, Jr.,** has been chosen president of the recently certificated scheduled passenger helicopter service. Senior is an aviation consulting engineer who formerly was with American Airlines and Glenn L. Martin Co. Cummings' prior connection was in the overseas service of Pan American World Airways.

INDUSTRY OBSERVER

►Minneapolis-Honeywell electronic attitude gyroscopes manufactured for USAF contain approximately 3,000 parts and cost $4,500 per unit. The device is subcontracted to 47 components manufacturers and parts and supplies are obtained from 97 other vendors. Manufacture of parts requires 183.3 hours and assembly and test by M-H requires an additional 192.5 hours.

►New Grumman twin-engine S2F anti-submarine plane, which Navy says is the first to be designed "from scratch" for carrier anti-submarine work, will be delivered beginning late this year.

►Deliveries will start this fall on the Bell HSL-1 anti-submarine helicopter, which can be based on cruisers and other medium size ships, as well as on small carriers.

►Navy testimony to House Appropriations Committee shows the new Douglas A3D twin-jet short-range atomic carrier bombers cost $3,250,000 apiece. Two have been made and a contract for 12 more is programmed, to be followed by mass production when the cost figures are expected to drop.

►Chance Vought's F7U Cutlass jet fighter is costing the Navy $2 million a copy in the quantities which Navy is buying so far, Congress is told. Congress questioned, as do some industry people in the know, a report that the electronics equipment on the F7U cost only $24,000. New super-sensitive combination system for yaw and pitch dampening, tailor-made for the Chance Vought Cutlass F7U-3 jet fighter, has been developed by General Electric. Chance Vought has required that the system be designed so that it can be made into a complete automatic pilot at a later date by addition of several more components.

►Navy is planning to get into the in-flight refueling act along with the Air Force and will equip a number of its planes for aerial refueling. So far, Navy has not disclosed its requirements for refueling tanker planes, or whether they will be carrier-based.

►Design freeze ordered into effect last May by the Air Force on current production combat aircraft has been resolved to one basic change per year per plane. These generally will include only power plant, armament and electronic gear changes.

►There were 46 Boeing KC-97 tankers in operational service for USAF as of Dec. 31, 1951. Boeing will continue deliveries to the Air Force through 1952 at a rate of eight per month. Equipped with the Boeing-developed "Flying Boom system," the big tankers carry less than 5,000 gal. of transferable fuel in the lower compartment of the figure eight-shaped fuselage. In tanker version upper fuselage section is unused.

►By January 1953, Bell Aircraft Corp.'s Niagara Falls plant will be devoted almost entirely to production of guided missiles, according to Bell Assistant General Manager Leston P. Faneuf. The company will continue some production for Bell helicopters and subcontracting for B-47 and B-36 aircraft at other plants. Faneuf said, "We're practically done with experimental aircraft. The X-1, X-2 and X-5 are being completed now."

►The Boeing B-52 sweptwing eight jet-engine bomber, probable heavy successor to the Convair B-36, does not have the long-range inter-continental capabilities of the B-36, according to disclosures made at Capitol Hill 1953 budget hearings. In-flight refueling of the B-52, along with the B-47, is being planned to make it an effective SAC intercontinental weapon. (This article was approved for publication in AVIATION WEEK by Air Force security review.)

►Commitments for aircraft by Air Force and Navy to North Atlantic Treaty Organization under Mutual Defense Assistance will be met and concluded by January, 1955, according to 1953 budget testimony.

AVIATION WEEK VOL. 56, NO. 14
APRIL 7, 1952

$14 Billion Asked for Aircraft and Missiles

- **1953 budget testimony reveals missiles trend.**
- **And AF would buy 7,573 planes, Navy 3,000.**

By Aviation Week's Washington Staff

U. S. air power fiscal year 1953 budget requirements adding up to approximately $13 billion in aircraft, and an additional $1 billion in guided missiles have been presented to Congress by the Air Force, Navy, and Army, official testimony released by the House Appropriations Committee discloses.

Based on the overall A-16 stretchout schedule, which Munitions Board and Defense Department tailored to come under the $52 billion budget ceiling imposed by President Truman, the 1953 service aviation obligations planned will buy approximately 10,000 military aircraft all told, and an undisclosed number of missiles.

▶ **Push-Button Era**—Increased appropriations for missiles, and indications by all three services that some missiles which these funds will buy are deemed ready for combat use when needed, are keys to the fact that push-button warfare is about here, as far as practicality of operation is concerned.

This readiness does not apply to the very long-range missiles, still a way off in development, as much as to shorter range air defense missiles, both air-launched and surface-launched, and somewhat longer-ranged Army tactical missiles and Navy submarine-launched missiles capable of bombarding those areas close to the coasts which they can reach.

Navy testimony indicated a strong new Navy drive for getting back into the Air Force realm of what used to be called strategic bombing. Noticeable was the fact that Navy spokesmen steered away from calling any of their A-bomb carriers or other bombers anything but attack planes. But a deft picture of how the Navy could carry the war to the enemy with carrier-based planes carrying bombs was woven through the strands of the Navy aviation hearings.

▶ **AF Wants B-36**—New pointed congressional inquiries on the fitness of the Convair intercontinental B-36 and the wisdom of continuing its procurement

Proposed Air Power Obligations

Air Force and Naval Aviation have told the House Appropriations Committee how they propose to obligate funds for U. S. air power in the 1953 fiscal year. Air Force's budget of $22.4 billion for the coming year (compared with $22.7 billion for the current 1952 fiscal year) and Naval Aviation's budget of $4.9 billion (compared with $5.2 billion for 1952) are now being reviewed by Congress.

Following are selected 1953 obligations proposed by the two air arms, as compared with 1952 obligations:

Air Force	FISCAL 1952	FISCAL 1953
	(000,000 omitted)	
Procurement of complete aircraft	$4,823.2	$6,567.2
Spares and parts	4,010.5	3,290.2
Training items (spares and parts)	98.9	45.6
Service test materiel (components for testing)	61.7	77.8
Industrial machinery and facilities	1,049	312.5
Major modification and modernization of aircraft	267.0	118.0
Guided missiles	130.0	300.0
Complete guided missiles	71.4	181.7
Spares and parts	4.2	14.6
Preproduction planning and facilities	30.4	60.9
Auxiliary equipment	22.9	42.7
Industrial mobilization	9.4	3.7
Research and development	185.3	325.0
Aircraft	74.2	74.0
Guided missiles	116.0	110.4
Propulsion	69.5	96.7
Electronics	54.6	68.7
Armament	35.5	45.5
Equipment	41.1	42.0

Naval Aviation	FISCAL 1952	FISCAL 1953
	(000,000 omitted)	
Procurement of aircraft and parts	$3,121.9	$2,898.0
Advance procurement of long-lead precision instruments	202.9	195.0
Expansion of aircraft facilities	443.0	175.0
Procurement of guided missiles	17.5	86.8
Air-launched missiles (Sparrow, Terrier)	(not reported)	53.1
Ship-launched missiles	(not reported)	33.7
Expansion of guided missile production facilities	0	28.0
Target drone procurement	16.3	37.9
Aircraft equipment for service training	10.9	6.4
Guided missile equipment for service training	0	.897
Aircraft modernization	29.2	18.3
Sub detection	5.8	.370
Electronic countermeasures jamming enemy signals	.536	2.1
Radar identification	1.3	1.9
Navigation aids	18.5	.749
Radio communication	.180	1.1
Electrical	2.6	.090
Missile control (for firing)	0	11.8
Aircraft overhaul, Regular Navy and Reserve	279.6	193.8
Research and development	161.5	185.0
Aircraft	56.7	62.5
Guided missiles	24.3	25.5
Power plants	19.3	29.8
Electronics	23.0	26.0
Shipboard aviation equipment	5.2	18.5
Industrial mobilization	6.2	7.2

(This is to cover cost increases.

*$22 million to complete outfitting Sperry-Farragut facilities at Bristol, Tenn.; $2 million for high-production tools at other plants; $4 million to expand component production facilities.

with 1953 funds, met solid opposition from Air Force spokesmen. They contended categorically that the plane was not obsolete.

Following individual sections on the Air Force, Navy and Army budgets give additional details from the 1953 aviation hearings:

Air Force

The 1953 Air Force budget contemplates a total $11 billion for 7,573 aircraft and related procurement to insure buildup to 126 combat and 17 troop carrier wings by December, 1955.

Of this amount, $6,567,218,617 finances complete aircraft; $3,290,204,236 would be allotted to purchase of components, spares and spare parts; $118 million for modification and modernization; $300 million for guided missiles; $3,766,000 for industrial mobilization; and $72 million for procurement and production administration.

The $6,567-million budget request includes $1,613,277,436 to complete financing of 1,163 aircraft of a total 7,431 planes ordered during fiscal 1952. The remaining $4,953,941,181 is requested to finance an additional 6,410 aircraft to be ordered during fiscal 1953.

► **Budget Stretchout**—The budget requests now undergoing congressional scrutiny are built within the framework of the Air Force-Navy stretchout Schedule A-16 devised by the Munitions Board and approved by the Joint Chiefs of Staff and Defense Department Jan. 16.

This new schedule revises the timetable for USAF's 126 combat wings and 17 troop carrier wings from in-being by December, 1954, to in-being by December, 1955. It relieves pressure for buildup to peak production of 1,250 planes per month by mid-1953 to 900 planes per month in mid-1953. The latter figure includes monthly production of complete aircraft delivered to USAF for delivery to its own units, those bought by USAF for Army and Navy, plus those to be delivered to the North Atlantic Treaty Organization under terms of MDAP.

While the new schedule for which Air Force is seeking congressional approval still builds to the same peak strength of 143 wings, it delays the goal one year—presumably a well-calculated risk.

► **500 Planes a Month**—For the industry, Air Force Undersecretary Roswell L. Gilpatric said, this means a slower buildup to a lower peak of 900 planes per month instead of to 1,250 planes. But, he pointed out, this means that instead of a drastic slash in production at year-end 1954, aircraft production will level out around 500 planes per month for an indefinite period.

Aircraft production under the proposed 1953 budget schedule will peak during the April-May 1954 period with airframe weight deliveries approaching the 14 million-lb.-per-month-mark. However, there will be a slight discrepancy if a comparison is made between peaking of numbers of aircraft delivered to airframe weights delivered. This is accounted for, he explained, by the fact that deliveries of lighter aircraft (utility, training and liaison) will peak earlier because of lesser production problems.

► **Complete Aircraft**—Air Force contemplates orders from fiscal 1953 funds of 39 different types of aircraft. While specific aircraft types by models are classified, they include: fighters, reconnaissance fighters, fighter-bombers, transports, bombers, utility, helicopters, trainers, search and rescue, etc.

Among the new aircraft to be ordered from fiscal 1953 funds is Convair-dubbed Vultee's supersonic XF-102 delta-wing interceptor. With production prototype delivery scheduled for early 1954, it becomes the first true interceptor to join the Air Force air defense fighter stable.

AVIATION WEEK has previously reported that the F-102 will be powered by a Pratt & Whitney J57 turbojet engine and will carry one air-to-air guided missile for armament. The completely automatic-pilot system is electronically operated and is being manufactured by Hughes Aircraft Co.

► **Other New Planes**—Other new aircraft to be ordered from fiscal 1953 funds are the English Electric-licensed Martin-built B-57A Canberra, the Douglas twin-jet RB-66 light bomber and a service quantity of Boeing RB-52 heavy bombers, plus additional funds for continued B-47B production.

First official indication of the scope of production of the Chase XC-123, which goes into production early next year at Kaiser-Frazer's Willow Run plant, is that eight of the contemplated 17 troop carrier wings under the 143-wing program will be equipped with assault transports.

According to Capitol Hill testimony, the $3-million-plus cost for each Convair B-36 which phases out of production at the end of fiscal 1953 is not at all excessive. Other bombers to come, Gilpatric told Appropriations Committee members, will cost more. How much more, Gilpatric did not say.

► **Guided Missiles**—From proposed fiscal 1953 funds, USAF requests a total of $300 million from which it will spend $181,718,000 for complete guided missile weapons; an additional $14,676,000 for initial components, spares and spare parts; $60,896,000 in preproduction planning and facilities; and $42,710,000 for auxiliary guided missile equipment.

All testimony given by Air Force members in defense of the $300-million budgetary requests to the Appropriations Committee was declared off-the-record except for the names of the six companies now in production with USAF guided missiles: Hughes Aircraft; Northrop Aircraft; North American; Boeing Airplane, Bell Aircraft and Martin Aircraft.

Of the $130 million appropriated for Air Force guided missile expenditure during fiscal 1952, only 6.9% had been obligated by Dec. 31, 1951, and by Feb. 14 a total of $24.1 million or 18.5% had been obligated for hard goods.

An Air Force spokesman told the congressional committee that although guided missiles were expected to make a major contribution in a future emergency they were still not expected

FIRST CERTIFICATED S-55

Sikorsky Aircraft's newly certificated S-55 ten-passenger or cargo helicopter takes the air over the Bridgeport, Conn. factory. Last week an S-55 was on its way to Los Angeles Airways to be used in the nation's first helicopter passenger airline operation.

to change the general way of fighting a war "tomorrow." Some missiles just entering in production today, this spokesman said, could well pay for themselves in the first month of war "if we can get it (a missile family) in place before D-day."

► **Closely Pared Budget**—The Air Force buildup towards 143 wings, Air Force Secretary Finletter told the congressmen, is designed for just one purpose—to give the United States an Air Force in-being capable of three jobs: 1. strategic air, 2. tactical air, and 3. air defense.

The wings comprising this strength are for U.S. protection only and do not deal with a fourth operation—forces capable of operating outside those limits. Our present structure, he said, is building to provide air defense for the United States—strategic air operation against any aggressor and the tactical air operation in Europe. There is nothing left over for any other operation such as Korea.

Today, he said, we are fighting a war in Korea and are drawing against our aircraft effective strength for U.S. protection. Air Force has no fat left for losses sustained in Korea. If the Air Force budget is cut it can be made only at the expense of our air defense, our strategic air and our tactical air.

"These forces are committed," Finletter concluded, "to the proposition of deterring anybody from starting a war. Only if they stay intact will they stop anybody from starting a war," he warned.

Navy

Navy plans to buy fewer planes in fiscal 1953, but will increase expenditures for missiles.

Reports by top Navy officials to the House Appropriations Committee show that 1953 funds scheduled for planes and parts total $2.9 billion, a drop of $200 million from the 1952 obligations total of $3.1 billion.

Meanwhile, funds allocated for Navy missiles procurement in 1953 are still small by comparison, $86.8 million, but represent a five-fold increase over missile procurement scheduled in 1952, reported as $17.5 million.

► **About 3,000 Planes**—Navy did not disclose (for the record) the exact number of planes in the program, but it is assumed that it was approximately 3,000. In 1952, orders by Navy called for a total of approximately 3,700 planes. And it was indicated that the number of planes scheduled for 1953 was 27% less than in 1952.

Admiral William M. Fechteler, Chief of Naval Operations, told the House committee that Navy aircraft procurement had been re-programmed so that aircraft deliveries would rise to about 300 planes a month by the end of fiscal 1953 and would be "held at this level." This would mean a steady Naval procurement of 3,600 planes a year. Fechteler pointed out that this would make possible improvement of Navy air equipment at a steady rate, and "a new feast-and-famine cycle with relation to the aircraft producers will be avoided."

► **Water-Based Fighter**—Navy's program calls for procurement of 27 different models of planes in 1953. Since World War II the Navy has ordered 41 basic models, including the 27 programmed in 1953.

A breakdown submitted to Congress shows that the 41 include ten carrier-based fighters, seven carrier-based attack planes, one water-based fighter, two carrier-based anti-submarine planes, three trainers, eight helicopters, one observation plane, six patrol bombers, three lighter-than-air craft.

► **Model Changes**—Differences in equipment are responsible for a number of the model changes with many models using identical airframes and engines, and with other models which are counterparts of planes being used by the Air Force.

Douglas AD series of attack planes was cited as an example of the equipment changes for night observation and search. It was pointed out that unit costs of planes in the attack group ranged from $353,350 to $4,063,270 due to differences in equipment.

Among other interesting price quotations in Navy congressional testimony:

• Unit prices for Navy fighters range from $612,250 to $2,081,000.

• Convair's new F2Y-1 which is a delta-wing transonic water-based fighter is price-tagged at $5,291,560 per plane, as compared with a unit price of $991,580 "for the comparable plane in the Air Force." (Presumably this refers to the USAF's new delta-wing Convair F-102 missile-carrying interceptor.)

• Bell's HSL-1 anti-submarine helicopter is tagged at $617,620 per unit, as compared with a unit cost of $159,624 for an Air Force copter which "may perhaps be comparable."

• An unspecified Navy plane—probably the Douglas A3D carrier-based atomic bomber—is quoted at a unit price of $3,647,714 as compared with a unit cost of $1,895,992 "for its opposite number in the Air Force." (The oppo-

CRITICS NOT CONVINCED

Loaded with sand bags to a gross weight of 48,000 lb., now deemed unsafe by CAA and CAB, nonsked Air Transport Associates' C-46 transport recently demonstrated one-engine climb-out, cruise and landing before a group of CAA and CAB officials at Friendship Airport, Baltimore. Top photo shows takeoff, lower view depicts landing with right prop feathered. But some of the spectators commented that a special test cannot be compared with what might happen if one engine cut on a routine commercial flight.

site number presumably is the Douglas R-66 which the Air Force is ordering with different engines and other equipment changes. The $3,647,714 price is slightly higher than another price quotation of $3,250,000 for the A3D reported elsewhere in the Navy justifications to Congress. The $400,000 difference probably is in equipment.)

Navy's missile program for 1953 calls for initial service use of two air-to-air missiles for air defense now in assembly line production, and one surface-to-surface offensive missile, presumably for submarine launching. It also provides for evaluation of several other air-launched and ship-launched missiles with different methods of guidance and target-seeking.

The Navy's two air-launched missiles have previously been identified as the Sperry-Douglas Sparrow and the Meteor. The surface-launched missile has been identified as the Convair Terrier.

Army

Army's meager 1953 budget for aircraft calls for a total expenditure of $36,107,000, approximately half of the 1952 allocation and one-third of that allocated in 1951 budget. It provides for two fixed-wing types, the Beech L-23 Twin Bonanza and the de Havilland L-20 Beaver, Maj. Gen. W. O. Reeder, Deputy Assistant Army Chief of Staff, told Congress.

It also includes two transport helicopter types, the Sikorsky H-19 and the Piasecki H-21, which are described as having cargo capacities of 2,000 and 4,000 lb., respectively.

▶**Supplement Coming?**—Presumably Army may seek supplemental 1953 funds for additional aircraft, later, since no apparent further provision is being made in 1953 funds for such planes as the Cessna L-19 and small Bell and Hiller helicopters, which are understood to have a continuing place in Army aviation, or for the larger Piasecki XH-16.

Reference in the Army testimony to a big Sikorsky 40-passenger helicopter, presumably is a mistake, referring instead to the Piasecki XH-16 40-passenger copter.

Army guided missile program obligations for 1953 are reported to total $400 million. The Army proposes to allocate approximately three-fourths of its missile procurement for two missiles in advanced stage, and the remainder for "a lot of new ones which are being made in smaller quantities for continued experimentation."

▶**Two Missiles Ready**—The two advanced missiles—one air defense, and the other surface-to-surface—are considered usable at this time, with good results, an Army spokesman told the House Committee. It is estimated that the cost of the air defense missile can be cut from $45,000 to $30,000 with the second order. It is estimated that the surface-to-surface missiles which costs $82,000 each for the first quantities, will be reduced to about $75,000 for the second order, and probably a still lower unit cost of $60,000 when it goes into the third order.

Wilson Declares Jet Production Is Rising

Retiring Defense Mobilizer Charles E. Wilson told his swan-song press conference in Washington that defense production is "really rolling" now and that the U. S. is fast overtaking Russia in quantity of war materials. "In quality, in my opinion, we have overtaken them," he said.

Obviously hitting back at recent newspaper columnist comparisons of Russian and U. S. jet engine production, Wilson said that U. S. aircraft production was mounting rapidly. Production of jet aircraft in the first quarter of 1952 was one-third higher than in the last quarter of 1951, he asserted. In calendar 1952 the 1951 jet aircraft production should be doubled.

As an indication of how total jet production was stepping up, Wilson said that in March one U. S. manufacturer alone produced 400 jet engines.

He declared that there had not been one pound of materials taken from military requirements for "butter products," but that materials decisions have been made on a basis of military requirements submitted by the Defense Department.

Dr. John R. Steelman, assistant to President Truman has been named as Acting Defense Mobilizer, pending the appointment of a permanent successor.

Non-Aviation People In CAA, Phoebe Says

Charging that "non-aviation people are taking over control of the Civil Aeronautics Administration," America's first licensed woman transport pilot, Phoebe Omlie, has resigned from the CAA. She was special assistant to the CAA Office of Aviation Development.

Mrs. Omlie declined to comment in detail, now. She cited the recent reorganization in the CAA Office of Aviation Safety as an example of bureaucracy. "First I'm going home to Memphis and go fishing; then I'll write it all out," she told AVIATION WEEK.

In her CAA job, she served under Wylie Wright, Chief of the Office of Aviation Development. It is reported that shifting lines of authority at CAA may soon make Aviation Development a section under a "Planning Division", headed by J. D. Blatt, presently Chief, Planning Staff division, Office of Federal Airways.

▶**Her Duties**—The CAA manual describes the duties of the Aviation Development Office, from which Mrs. Omlie resigned, as follows: "to foster . . . improve aircraft, equipment, and related products, especially for personal and agricultural uses . . . air flight facilities and the elimination of unnecessary restrictions and regulations hampering aviation . . . establishment of a system of 'skyways' . . . and other civil aviation development."

Mrs. Omlie first won fame for such stunts as "wing walking" with her first plane, a Curtis Jennie. She paid for this first plane by wing-walking for Fox Moving Picture Co., which dubbed her stunt pictures into the "Perils of Pauline" series. She was the first woman to enter the Ford Reliability Tour, in 1927, and she won several transcontinental air races.

Some of her more recent work for CAA included influencing Tennessee to earmark all revenues from its 7-cent aviation gas tax for aviation improvements such as state airport and airways facilities.

Mrs. Omlie has also been active in consulting for the Civil Defense Administration.

PAL Buys 9 2-0-2s Replacing Its DC-3s

Pioneer Air Lines will spend $4.2 million on purchase of a fleet of nine 36-passenger Martin 2-0-2s, spare parts, and training its organization in the operation of the twin-engine transports. The 2-0-2s will replace PAL's entire fleet of 11 DC-3s.

The 2-0-2s are expected in service over Pioneer's 21-city system around mid-1952. Texas Engineering & Manufacturing Co. will modify them for local service operation.

Braniff Pilot Lands Burning DC-4 Safely

All 46 passengers and crew escaped unhurt from a Braniff Airways DC-4 accident Mar. 27, following an emergency landing at Hugoton, Kan.

One hour out of Denver, bound for Oakland, a fire was spotted under the Number 3 engine. The pilot headed for the small airport at Hugoton. Just 7,000 yards short of the field, the engine quit.

The plane landed on the field, but the brakes did not work, presumably due to fire damage to the hydraulic system, according to CAB's preliminary report.

Put Your Scrap Back to Work

NEW THUNDERJETS, the fighter-bomber version of the F-84F (foreground) and the photo reconnaissance F-84F, shown in test flights over Edwards AFB, Calif. Both are equipped with Wright-built J65 Sapphire jet engines.

2 New F-84Fs

- **Fighter-bomber, photo recon types scheduled.**
- **Six .50-cal. guns and 24 rockets arm fighter.**

Production is scheduled to begin late this year on two new versions—fighter-bomber and photo reconnaissance—of Republic Aviation Corp.'s (sweptwing F-84F Thunderjet. Both models will be fed in at the end of the straight-wing F-84G line, currently turning out an estimated 50 or more planes per month at Republic's Farmingdale, N. Y. plant.

A pre-production prototype of each model is now undergoing flight tests at Edwards AFB, Calif. Major difference between these and the earlier F prototype is in the use of wing-root air intakes for the Wright-built J65 Sapphire turbojets.

► **Fighter-Bomber**—The F-84F—marked

VERSATILITY is emphasized in new Republic F-84F. It can carry a wide variety of armament; some standard operational loads are illustrated above.

FS-345—will make its first appearance with the earlier nose inlet, to simplify production changeover. Later deliveries of the model will have the solid nose and wing inlets.

Performance of the F is classified, except for the statement that it can fly faster, higher and farther than the F-84E series now in Korea.

Standard armament is a sextet of .50-cal. machine guns, four in the nose and one in each wing root. External armament is much more formidable, including 24 5-in. HVAR rockets or four 1,000-lb. bombs. Additional fuel—including 230-gal. drop tanks—and armament—which might mean two 1,000-lb. bombs or napalm bombs—can be made into alternate loads.

The F can also function as a long range escort fighter; in this role, it carries two 450-gal. fuel tanks which increase radius of action to well over 1,000 mi.

Close inspection of the F photo shows that its new nose begins at the original junction of spun nose cowl and fuselage frame.

▶ **Photo-Recon**—The RF-84F has a completely new nose from windshield forward. The prototype has obvious flat spots on the sides and front of the nose which indicate the camera locations. Production versions presumably will carry either windows or window-framing.

Four .50-cal. machine guns arm the RF version, a pair in each wing.

Production versions of the RF-84F (marked FS-828 in the photo) will retain the wing-root inlets of the prototype.

There are some minor differences in appearance between the two new craft and the first F-84F prototype. The new ones have the tail-pipe exit closed down further, which gives a more-rounded appearance to the exhaust nozzle.

The once-clear cockpit shows the marks of the production canopy fix—plastic tape bonded to the Plexiglas external surface to increase bursting resistance.

Both new airplanes lack the wing trailing-edge fillet of the experimental F, and both have flat-front windshields instead of the V-front which characterized the first craft.

Air Force General to Head War College

Lieut. Gen. Howard A. Craig, USAF, has been appointed the next commandant of the National War College by President Truman, replacing Lieut. Gen. Harold R. Bull, U. S. Army. Named to replace Craig as Inspector General of the Air Force was Maj. Gen. Bryant L. Boatner, now commanding USAF's proving ground, Eglin AFB, Fla.

CAA Funds Cut

- **Proposed budget slashed $18.8 million in House.**
- **Navigation and airport funds trimmed most.**

Objecting to government support of the airline industry through maintenance of the federal airways system, House Appropriations Committee slashed $18.8 million off Civil Aeronautics Administration's proposed $163.1-million budget for the coming 1953 fiscal year which will begin July 1.

The cutback to $144.3 million would require substantial retrenchment of CAA whose current year budget totals $162.8 million.

Seconding the President's recommendation that a system of airway user charges be established, the committee commented: "The airline industry has reached the point where it needs less government support."

▶ **Jet Test Out**—The committee flatly turned down the request for $1.4 million to start a testing program of jet passenger transports with the observation that "This type of aircraft development should be carried on and financed by the plane manufacturers and the commercial airlines rather than the federal government."

Civil Aeronautics Board's budget for the coming year was clipped $180,000 to $3,800,000, slightly below the $3,875,000 the Board has this year.

▶ **The Details**—Following are details on the House Committee's action in CAA's budget:

• **General administration.** Clipped $2.5 million, reducing the allocation for salaries and expenses to $106 million which will still permit a slight expansion of CAA's staff. Allocation for the current year—$105 million. The committee stipulated that "No part of the reduction . . . shall be so applied as to cause any relaxation in a maximum safety standards."

• **Establishment of air navigation facilities.** Cut $8 million off CAA's request for $21.1 million. The $13 million allowed will provide for improvement of existing facilities, but not for additional facilities.

• **Airports.** Trimmed $6.5 million off the $26.5 million asked by CAA. Of the $20 million allowed, $5.5 million is to liquidate existing contracts, $11 million is for major airports on the continent, $320,000 for ports in Puerto Rico, $200,000 for Hawaii, $125,000 for Alaska, and $30,000 for the Virgin Islands and the remainder for administration.

• **Air navigation development.** Cut $250,000 off the $2 million requested for planning and development of a system of aids to air navigation and traffic control, allowing $1,750,000.

Australian Sabre To Get New Avon

(McGraw-Hill World News)

Melbourne, Australia—Some plans for the Australian-built Sabre have undergone yet another change and it is now revealed that it will have a more advanced Rolls-Royce Avon engine than originally planned.

With the new engine the top speed of the plane should be at about 720 mph.

The Commonwealth Aircraft Corporation is presently tooling up for the production of the RA-7 Avon engine, but if the new plans are realized this engine will not be used in Sabres but will be installed on the twin-engine Canberra bombers also being made in Australia under license.

The new Avon engine for Sabres may develop up to 50% more horsepower than the current RA-3. That would be almost twice the horsepower now claimed for Sabres operating in Korea.

The Australian-built Sabre also will have an extended range of operation in comparison with present U.S. models. But the first Avon engines for both the Canberra and the Sabre will have to come from England. In expectation of this the Commonwealth Aircraft Corporation is completely reorganizing its Fishermen's Bend factories.

RAF Now Has Two Canberra Squadrons

(McGraw-Hill World News)

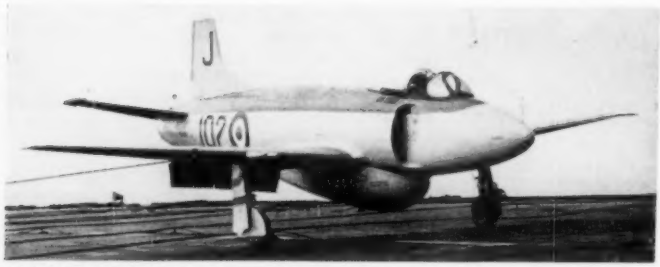
London—The Royal Air Force has unveiled its first two jet bomber squadrons.

No. 101, famed for its attacks on the German rocket research station at Peenemunde during the last war, is operating English Electric Canberra B. Mk. 2s which seat three.

Another well-known British unit, No. 617, which blasted the Mohne and Eder dams during World War II, is in the process of being equipped with Canberras. Both units are based at Binbrook, Lincolnshire.

The Canberra units will be equipped to operate day or night, and pressurized suits permit them to go up over nine miles. A new visor to cut glare at high altitudes is being tested.

A. V. Roe and Handley Page, in addition to English Electric, will build Canberras. English Electric has delivered some 30 planes thus far.



ARRESTER WIRE stops a Supermarine Attacker short on deck of carrier HMS Eagle.

TIED TO CATAPULT, Attacker will be "fired off" by controler in enclosure.

STUB WINGS FOLDED, two Attackers are ranged on deck awaiting further flight duty.

Eagle Gets First Royal Navy Jets

New British carrier in shakedown cruise with Vickers Attacker squadron: Sea Hawks coming later.

By Nat McKitterick
(*McGraw-Hill World News*)

Off Spithead, English Channel—The Royal Navy's newest carrier, the 45,000-ton Eagle, is being broken in with the Royal Navy's first carrier-borne jet squadron. The press got a look at six Vickers Attackers of the Eagle's Squadron 800 in takeoff and landing practice.

After only ten flying days, the Eagle's officers and men were getting the jets off from the Eagle's hydraulic catapult at minute and a half intervals.

The Eagle still has no crash barrier for jets, so each aircraft had to be stowed below after landing. Considering that, the average time of 55 seconds from touch down to cleared decks looked very good for a new crew with a new aircraft.

▶ **For Heavier Craft**—The Attackers, powered by a single Rolls-Royce Nene jet, looked like pingpong balls when they hit the Eagle's arresting gear. Obviously the carrier can "land on" far heavier and faster aircraft. The Attackers were fitted with self-disengaging arrester hooks which enabled the pilot to waste no time taxiing to the waiting hangar lift. The lift itself is a new, high-speed variety.

The Attackers were positioned in the hydraulic catapult by an automatic device which snapped the tail wheel into line. A nose harness had to be fixed to the aircraft and catapult by hand, which operation, when mastered by the still-green crew, should cut the 90-second takeoff time still further.

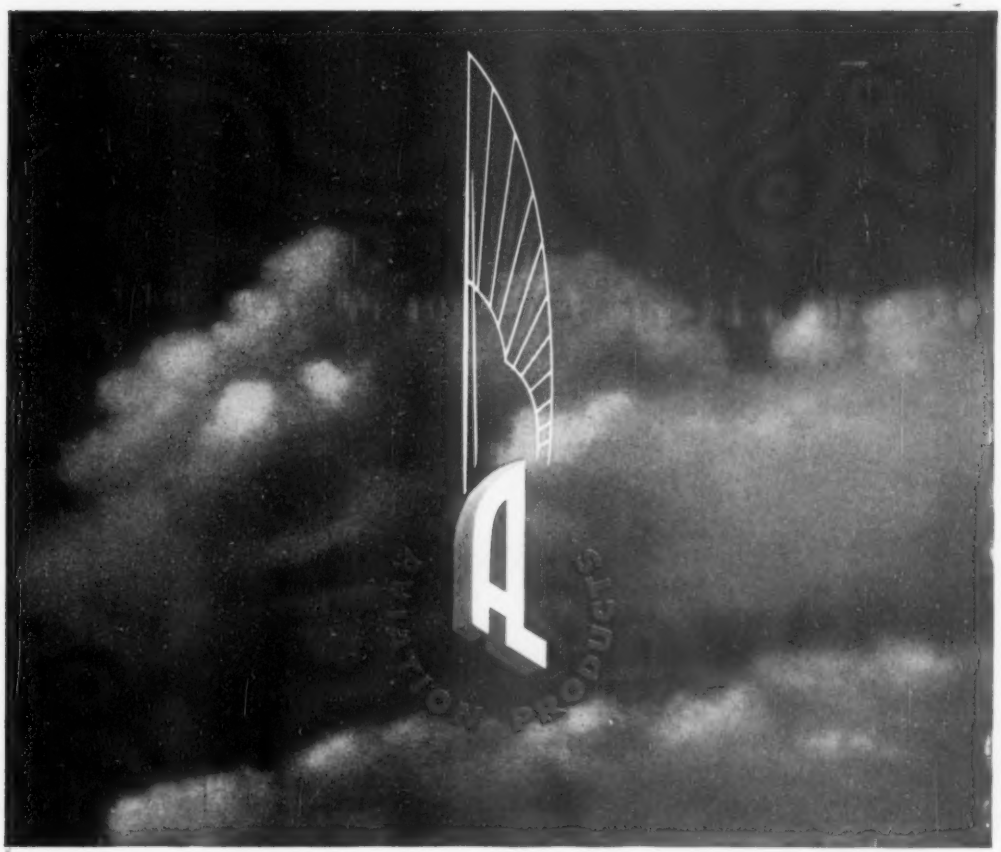
Sometime this year the Royal Navy's new steam catapult (AVIATION WEEK Mar. 24, p. 32) will be installed on the Eagle. HMS Perseus has just returned from Norfolk where the catapult was demonstrated to the U. S. Navy. The British report highly favorable reaction.

▶ **How It Works**—The steam catapult operates on the principle of a slotted cylinder and has no rams or hydraulic purchases. The hook to which the aircraft is joined is directly attached to a piston, driven along the cylinder by high pressure steam from the ship's main boilers. Besides speeding up launchings, the steam catapult will reduce the need for carriers to steam for long periods into the wind before launching their aircraft.

The Eagle is equipped with a comprehensive system of flight deck lighting for jet operations at night. While the carrier's armament is light—16 4.5-in. guns in the main battery, and 61 lesser calibre automatics—its speed and maneuverability are impressive. Below decks, there is a control room not unlike those used by RAF Fighter Command.

▶ **Room for 100 Planes**—The carrier can accommodate about 100 aircraft, all of which should be ready by June. Included will be five squadrons of Attackers—actually an interim type until the Hawker Sea Hawk comes into service later this year. A squadron of aging Fairey Firebrands now in use added a touch of the grotesque to the demonstration. With their manually folded wings, the Firebrands handled very awkwardly compared to the sleek Attackers. In the air, they looked like sitting ducks.

The Eagle's overall length is 803 ft. 9 in.; water line breadth, 112 ft. 9 in.; maximum draft, 36 ft. She carries a complement of 88 officers and 1,337 ratings, excluding embarked air squadrons.



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FINANCIAL

KLM Loan Blazes a Carrier Trail

Grant for $7 million is the first made by the World Bank to an airline; Chase National Bank participates.

The $7-million loan granted to KLM Royal Dutch Airlines by the International Bank for Reconstruction and Development (World Bank) is the first loan the World Bank has made to an air carrier.

Further, a private bank, the Chase National Bank, is participating directly by agreeing to advance up to $3.5 million of the loan, for which it will receive notes of KLM. This is also the first instance where a private bank is participating in a World Bank operation.

The entire loan is guaranteed by the Netherlands Government and will further be secured by six Super Constellations from the trans-Atlantic service.

The loan will run for 6½ years and bear interest at 4¼%.

▶**Government Aid**—Of underlying and more lasting significance is the form of indirect subsidy received by foreign airlines in support of their operations through their governments. The support in this instance is present through the loan guarantee by the Netherlands government. Certainly the relatively low interest rate of 4¼% speaks well for this loan guarantee by the carrier's home government.

U.S. domestic airlines holding certificates of public convenience and necessity from the Civil Aeronautics Board and implied support through mail payments have recently paid a rate as high as 5% for bank credits they have received.

The current KLM loan is designed to provide about 20% of the funds needed to finance some $33 million in new equipment purchases in the U.S. The balance of the funds required will be provided from the airline's own resources.

New planes on order are nine Lockheed Super Constellations, seven Douglas DC-6Bs, one DC-6A cargo plane, and six Convair 340s.

This is not the first time Holland has guaranteed KLM loans for funds for equipment purchase in the United States.

In 1947 KLM bought nine Constellations through an Export-Import Bank credit of $3,161,812, repayable in four years at 3% interest. This loan was guaranteed by the Dutch government and has since been repaid in full by the airline.

▶**ECA Aid**—KLM has also benefited from ECA grants. Since an equivalent of ECA grants in local currency is required to be deposited by the beneficiary in a counterpart fund, the proceeds of such grants are not directly reflected in the accounts of the company.

Available information indicates that ECA procurement authorizations for shipment of aircraft, engines and parts to the Netherlands totaled $29,562,000 as of Mar. 31, 1951, and that paid shipments, totaling $25,417,000 as of the same date, included $10,400,000 in complete aircraft, $4,842,000 in aircraft parts and accessories, $7,650,000 in aircraft engines and accessories, and $2,525,000 in other equipment. It is believed that the bulk of these shipments under the ECA program were made to KLM.

By the end of 1948 ECA had allocated $8 million for the purchase of American aircraft (mostly DC-6s) by KLM.

The strong Netherlands government interest in KLM stems from the importance of the airline to the national economy in linking the mother country with its colonies. At the 1949 year-end, the government owned about 88% of KLM's outstanding capital shares, approximating some 58 million guilders. (The guilder is now quoted at $0.2638.)

▶**Government Control**—Under a law of Aug. 21, 1950, the government holdings of KLM stock were to be increased by 65 million guilders from 51 million to 116 million guilders ($30,508,000).

Of this total amount, 50 million guilders represent a conversion of previously authorized indebtedness of the company to the government, and 15 million guilders are a new investment by the state in the company. The authorized capital was raised from 100 million to 200 million guilders, but there is no indication of any increase in privately held stock.

The government apparently controls today, directly and through the Netherlands Railways, some 98% of the stock of the company, with corresponding voting power. Most of the private

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The planes shown above are typical designs that incorporate Aerotec Automatic Controls. The Republic F-84F Thunderjet, a combat-proven craft, uses Aerotec pressure switches and a new dual float switch suitable for tip or pylon mounted auxiliary fuel tanks. Boeing has long used Aerotec valves, float switches, and pressure switches on their famous planes.

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shareholders are nationals of the Netherlands government.

KLM has received government aid in the form of direct subsidies, capital investment, loans, guarantees of borrowing and expenditures for airports and other facilities. KLM received direct subsidies from the beginning of its activity until World War II. Under the basic agreement between the company and the government, approved by a law of Aug. 4, 1947, the Minister of Transport and Waterways may propose that a subsidy be granted to the company, the amount to be determined from year to year.

No direct subsidies were given in 1946, 1947, 1948, and 1950; by the law of Aug. 21, 1950, however, the company was granted a direct subsidy of 27,200,000 guilders ($7,153,600) to cover its loss in operating the service to the East Indies in 1949. In addition, a non-interest bearing loan of 10 million guilders ($2,630,000) was made by the government to the company to cover most of the remainder of the losses sustained in 1949. This loan is repayable out of future profits only, with the provision that any unpaid balance remaining after 1964 is to be canceled.

In view of these terms, this "loan" may, in effect, be considered as a form of direct subsidy contingently recapturable out of future profits.

Government loans and guarantees have also been made internally by the Dutch government in the interest of KLM.

It is evident that KLM receives substantial support from its government. Subsidies are not as direct or even comparable in form to those granted U.S. flag airlines by their government. The World Bank loan to KLM may be construed in some quarters as an instrument of affording further subsidized operations—this time by the U.S. to foreign carriers. This is hardly correct as the World Bank represents what its name implies, although the bulk of its funds are derived from the U.S.

While KLM obtained funds on a highly favorable basis, the loan is conceived on a sound economic premise and will be self-liquidating. Further, this credit facilitates the purchase of American equipment and provides the Dutch the means with which to earn valuable foreign exchange, thus strengthening their economy.

—Selig Altschul

(EDITOR'S NOTE: *Certain background data in the above account is taken from the author's comprehensive independent report on Subsidy Policies of Foreign Airlines prepared last year for the Interstate and Foreign Commerce Committee of the U. S. Senate.*)

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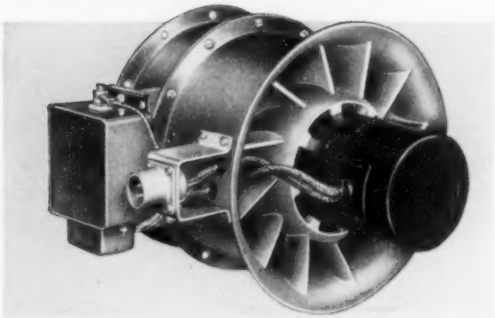

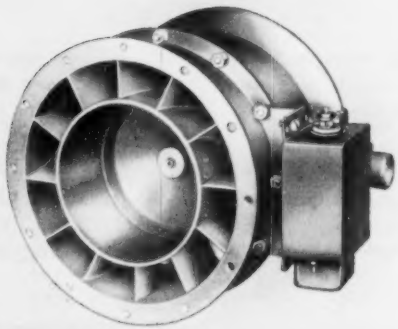

WAD A 4107

The North American B-45 "Tornado" Bomber, like most U. S. aircraft, has many features designed solely for the flight personnel's comfort.

Acting on the logical assumption that a more comfortable pilot is a better pilot, North American engineers called for a cockpit-cooling system of Joy Axivane Fans to keep the flight personnel from melting while waiting for take-off on hot days. When the "Tornado" is airborne, the fans are used in conjunction with a heating system to furnish warm air for canopy defrosting. On the RB-45 photo-reconnaisance bomber, the same fans also keep the camera ports free from frost or fog.

The versatility of this system is largely dependent upon that of the Joy AXIVANE Fan. The fans used on the B-45A, B-45C, and RB-45C provide 250 CFM at 6.5″ W.G., yet they are only 6.5″ in diameter and weigh but 9 lbs.

● Joy designs and builds each fan to the exact requirements for which it is intended. Each fan, therefore, is custom-engineered for highest efficiency. For many purposes stock fans can be supplied from the extensive line already designed. Both single and two-stage units available. Optional features include straight or flared inlets, beaded or flanged connections, radio noise-filters, anodization, and cooled motors where required.

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New Data Released on Fairey Gannet

- **Low maintenance time and twin-engine reliability keynote Double Mamba-powered anti-sub craft.**
- **Royal Navy's policy is to switch to jet types and thus cut gasoline storage hazards on carriers.**

The Fairey Gannet, now in quantity production for the Royal Navy, is England's—and probably the world's—first turboprop-powered subhunter. As such, it incorporates several unique and many unusual design features.

First look at some of these features came about one year ago, when Fairey Aviation Co. Ltd. announced that a production contract had been awarded the firm by the Ministry of Supply on recommendation of the Admiralty (AVIATION WEEK Mar. 5, 1951).

Now a second, and more detailed look is provided jointly by Fairey and Armstrong Siddeley Motors Ltd. in what the British term an "appreciation" of certain characteristics of the Gannet.

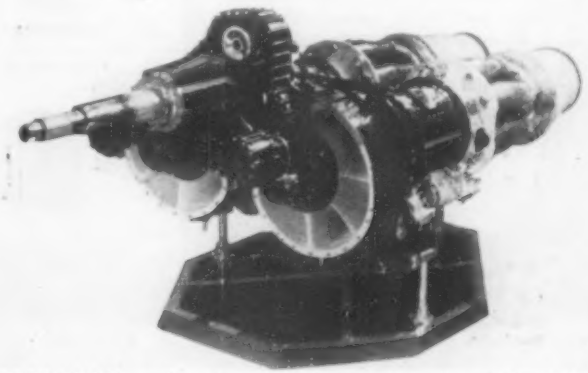
► **Turboprop Engine**—The single outstanding feature of the Gannet is the Double Mamba turboprop powerplant. This Armstrong Siddeley engine is actually a twin; that is, it consists of two independently operating engines which can be run as a pair or individually. Each engine drives a propeller; both props are concentrically mounted and are counter-rotating. However, it must be remembered that they do operate independently, and both props cannot be driven by one engine.

Recognition features of the Gannet are its appearance—deep fuselage, with three-man crew sitting high; inverted gull wing; triangular tail; and the characteristic, angry-bee whine of the engines.

Much of the disposable load of the Gannet is taken up with anti-sub warfare. Attack weapons are stowed in the bomb-bay, and sonobuoys and other gear can be slung under the wings. Radar is housed in a special, retractable radome which is lowered astern of the rear cockpit for operations.

Double-folding wings are used, hydraulically operated. Usual deck equipment to permit operation from carriers is included.

► **Engine Choice**—Gannet's design team specified turboprop power from the start because of the Admiralty policy against gasoline on carriers. (This applies to future Fleet types—most



DOUBLE MAMBA used by Gannet is a compact unit turning out about 3,000 eshp.

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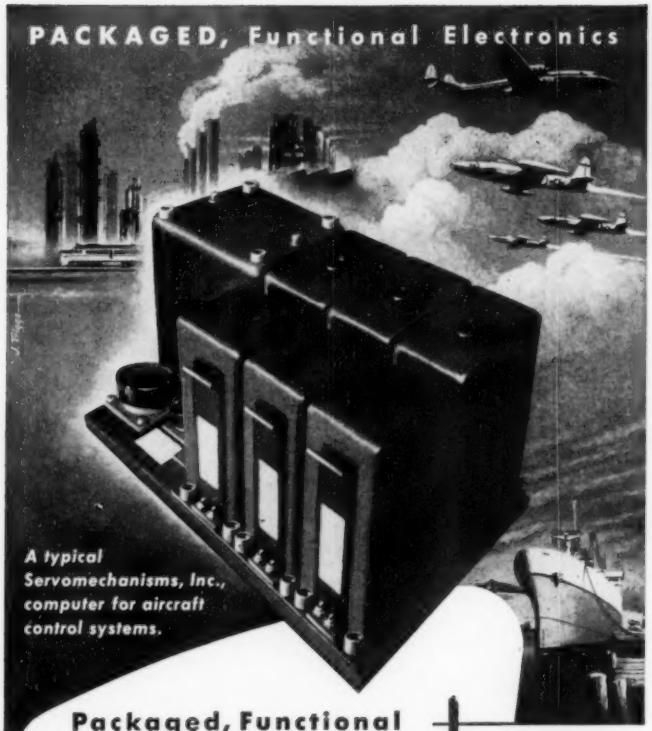

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Royal Navy aircraft use gasoline for fuel.)

Since most of the life of the aircraft would be spent at cruising power, a twin-engine installation was suggested. Reason for this was that the specific fuel consumption of a gas turbine engine increases as the engine is throttled down. Thus, one large engine throttled for cruise would use more fuel than a smaller engine running near maximum power, assuming both engines to be putting out the same amount of power.

This led to the idea of using two smaller engines, running both when needed, but planning to cruise on one only, with the other shut down. In addition to the advantage with respect to fuel, the life of the engine is increased. Engines can be used alternately during cruise, to distribute the wear on both halves of the powerplant. And because of the coaxial props, there is no offset thrust to worry about during single-engine operation.

► **Low Maintenance**—Service maintenance statistics are not yet available; but Armstrong Siddeley engineers see no reason why the maintenance required for turboprop engines should not be almost that of the turbojet. AS experience has been that jet engines require about half the maintenance man-hours per flying hour that piston engines require.

And there is no reason, says the appreciation, why the overhaul period and ultimate life of the turboprop engine should not be at least as great as for piston engines.

The interchangeability of the two halves of the Double Mamba means a reduction in the amount of spares to be stocked.

All these factors combine to save first cost, maintenance, personnel and operating costs.

► **Easy on the Ears**—Photos of the Gannet show that the exhaust nozzle from the Mambas is aft of the furthest aft crew position, which means a low noise level in all three crew stations. This will result in greatly lessened noise fatigue on long operational flights, thus improving crew efficiency.

The turboprop installation is also easy on the eyes; there is no flame visible from the exhaust nozzle. Usual means of flam-damping for piston engines are bulky and cause extra drag, loss of power and hampered view. Any glow from hot metal in the Gannet exhaust system will not be visible because of the curvature of the tailpipe as it leaves the fuselage.

Automatic propeller feathering is another feature of the Double Mamba. In the event of failure of one half of the powerplant, the feathering system goes into action as soon as it senses that the propeller is attempting to windmill that engine. (This occurs, of course, as soon

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as the net thrust is zero from that engine.)

▶**Power Production**—The powerplant is controlled by a single lever for each half of the engine; fuel and prop controls are linked with these individual controls so that operation is as simple as possible. A torquemeter is also incorporated so that the pilot gets the power output of either engine directly.

In tropical climates, the power output of the turboprop engine drops more than a comparable piston engine does. In the case of the Double Mamba, water methanol injection is being developed and will be installed. This will largely make up for the power decrease with increased temperature.

Arctic operations work the other way, and the power output of the engine is increased with decrease in temperature. Experience to date has shown that the engine can be started without oil dilution or any other special precautions down to about minus 4F. Using a special oil should enable starts to be made down to minus 40F.

Dirt and dust don't seem to bother the engine much, although possible erosion of the compressor or turbine blades may result. With steel compressor blades, the engine is able to operate in sandy conditions without trouble "for any reasonable length of time." Some tests were made with an engine which had light alloy compressor blades; in that case, about 35 lb. of sand was injected into the engine, and it continued to function satisfactorily.

▶**Future Development**—The Double Mamba is really at the beginning of its development life. It can be assumed that improvements in both power output and fuel consumption will follow.

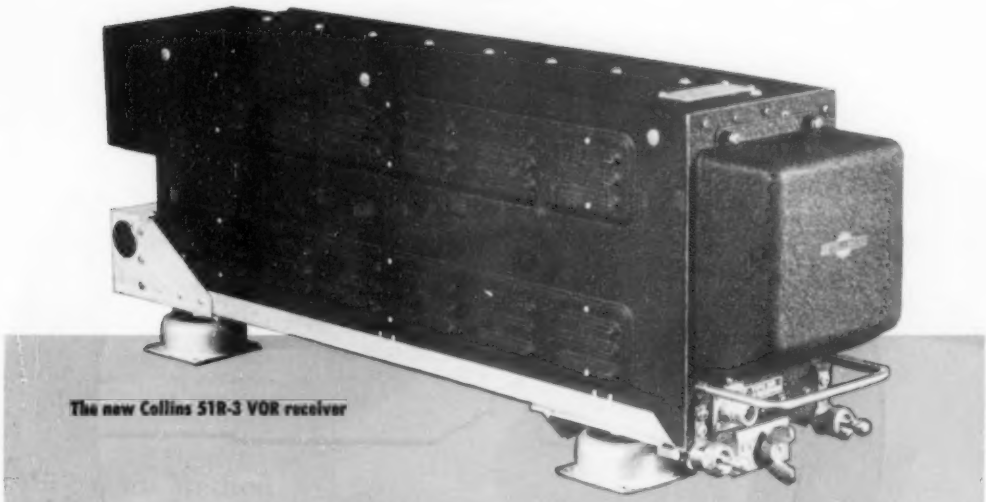
Armstrong Siddeley says that there is considerable development potential in the engine which will enable greatly increased power with reduced specific fuel consumption. And they emphasize that these improvements will be obtained without sacrificing engine life and durability. They are to be achieved by improving engine efficiency, and not by merely running it hotter. In fact, says the appreciation, these improvements take no account of the advent of new materials which could allow higher working temperatures to be used.

—DAA

Army Finds New Uses For Aircraft

The Army Engineers say they've developed a new "rapid method" of mapping and artillery fire control with aircraft "to eliminate the time-consuming conventional ground survey methods."

Only airborne equipment needed is an aircraft with lights or flares and a



The new Collins 51R-3 VOR receiver

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It was 1946 when Arinc tossed the omnirange ball into the radio industry's court. Collins has been throwing baskets ever since.

First demonstrations of the Collins 51R airborne VOR receiver and instrumentation were made in January, 1947, for Arinc, commercial airlines engineers, and the Air Transport Association's research group. Collins designs were approved.

Within a year, orders for 51R equipment were received from American, Chicago & Southern, Northwest, Pan American and United. Since then almost every leading airline of the United States (and, most recently, Air France), as well as many users of executive aircraft, have adopted the 51R as standard.

Collins has earned and is widely accorded the leadership in the VOR field and today, by a wide margin, is the largest producer of airborne VOR receivers and accessories.

The 51R research-engineering team has never stopped playing ball — studying users' servicing and performance reports — engineering refinements and incorporating them in 51R design. The 51R-2 was a prime example of the value of this continuing effort toward the ultimate.

We now announce the 51R-3, which represents the latest advances in performance and ease of servicing.

In general, the changes include, a: greatly improved stability over wider ranges of temperature and climatic conditions, and b: potentiometer type adjustments for all major instrument circuits, and component location changes which save much bench test time.

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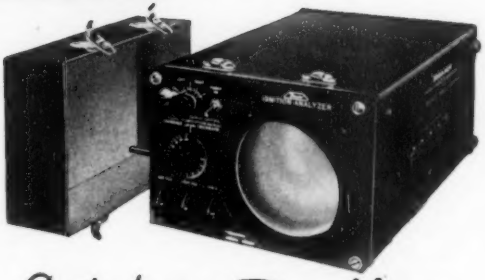
Detailed information available on request.



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The Bendix Ignition Analyzer is available for either airborne or portable-airborne installations. It can be used with either high or low tension magneto or battery ignition. It is the ignition analyzer that can predict spark plug failure before it occurs . . . make an efficient check of more than one spark plug at a time and do so on a large, easy to read screen . . . yet it costs less than comparable analyzers.

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remote-control system for simultaneous tripping of camera shutters at various ground survey stations. The ground survey parties add remote-controlled cameras to survey theodolites.

So equipped, the dispersed ground parties draw a continuous bead on the airborne flare. Three ground parties know where they are. The others don't. From the simultaneous photos of the angle of observation of the target at each station, the engineers compute location of the unknown stations by triangulation from those of the known stations.

The system was tested recently by the Engineer Research and Development Laboratories, Fort Belvoir, Va. The engineers call their new technique "flare triangulation." The laboratory reports the tests were successful, and the method "can be repeated to the extent desired for control of maps and artillery fire."

New Photo Method Aids Missile Study

The combined use of stroboscopic and silhouette photography in a new technique for flight testing missiles is announced by U. S. Naval Ordnance Test Station, China Lake, Calif.

Called multiple-image silhouette photography, the new approach photographs a test missile six times on a single plate using stroboscopic light.

▶ **Ballistic Range**—The work is being done in the Aeroballistics lab of the test station. Test missiles are fired from a 3-in. gun down a 500-ft. range. During their flight, photos are taken every four feet by 23 pairs of ballistic cameras. And each of the cameras shoots six times on its single plate.

These photos are used to measure missile characteristics. But to study the prints, it is necessary to have sharp definition. And definition is a function of missile-background contrast.

The number of superimposed light flashes effected the contrast—the more flashes, the less contrast. Even white paint background didn't help much.

So the research people thought of Scotchlite, the reflective sheeting with tiny glass beads, and that did it. Scotchlite, which is a product of Minnesota Mining and Manufacturing Co., has about 225 times the reflective power of white paint. And used as a background, the Scotchlite gave enough contrast between missile and background to permit photography.

Britannia Rules

(*McGraw-Hill World News*)

Melbourne—Tasman Empire Airways Ltd. has decided upon the turboprop-powered Bristol Britannia transport as a replacement for its Short Solent flying boats and orders are expected to be placed in England in the near future.

HONEYCOMB FOR RADOME

Development of preshaped Hexcel glass fabric honeycomb plastic is speeding layup time for radomes and other aircraft parts. Pieces are now being made for North American's F-86D by California Reinforced Plastics Co., Berkeley, Calif. Parts are first precurved and then precut to eliminate waste and allow immediate layup. Thirteen identical pieces (as shown) and one nose piece are furnished for the F-86D. Lamination of the parts completes the radome.

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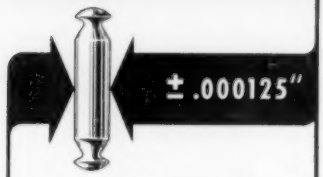

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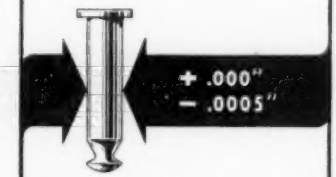

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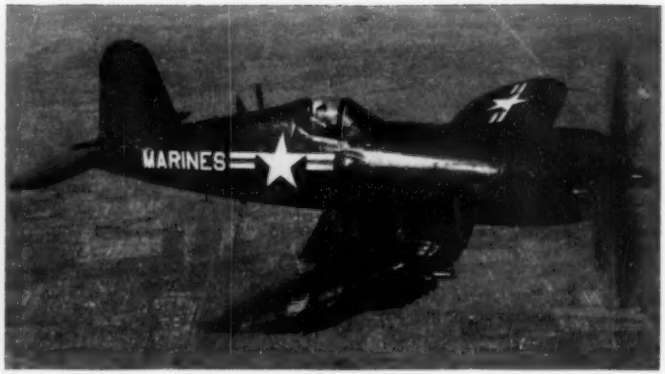

Another Corsair Sweeps the Skies

Chance Vought comes up with the AU-1, heavily armored ground-support version of its famous fighter.

It looks like a Corsair, and it's called a Corsair. But it's no longer the F4U—it's Chance Vought Aircraft division's AU-1, latest version of the immortal Corsair.

Basically a conversion from the F4U-5 fighter-bomber, the AU-1 design was sparked by the Korean conflict. The new craft uses a single-stage Pratt & Whitney R-2800-83W reciprocating engine. Major changes have been made in the engine installation because of the change in engine type. Increased armor protection and offensive armament were also included in the conversion.

▶**Combat-Designed**—The Corsair has performed nobly in Korea. Navy and Marine Corps pilots have been pounding Red forces from the airborne offices of F4U-4s and -5s. But fighting from those seats was not exactly one-sided. The Red anti-aircraft fire improved; even their small arms fire was fatal at times. Pilots were being deprived of some of the protection of altitude when they had to go hunting in the valleys and close to the ground.

Navy's Bureau of Aeronautics wanted a new—or at least, better-suited—airplane to do the ground-support job. They decided to save time and money by converting the F4U-5 fighter-bomber, which was already in action. The result is the AU-1.

There were advantages to doing it this way instead of waiting for delivery of a new plane. The Corsairs were on the job; they were also in production. Conversions could be made rapidly and reach the Korean theater in time. Further, service personnel would know the craft, and spares and maintenance wouldn't be much of a problem.

▶**One More Change**—So Vought, which had done about everything possible with the gallant Corsair, set about to do one thing more. These were the changes:

The AU-1 is not a high-altitude fighter; it works down with the ground troops. So the two-stage engine of the earlier Corsairs was replaced with a single-stage R-2800, and this did away with the intercooler. With the intercooler eliminated, there was space in the engine accessory section to mount the oil coolers, taking them from their exposed location in the wing roots. Air for the oil coolers is taken in through the wing root inlets, discharged into the accessory compartment and throttled by a flap at the bottom of that compartment.

Wing root inlets also provide the carburetor charge air on the AU-1; this eliminates the nose cowl scoops which were a recognition feature of the F4U-5. Actually the -5 charge air ducts remained in the same position on the AU-1, and a refairing job closed off the nose scoop inlets.

A low-level warning system was made a part of the oil system. This was a direct result of Korean experience, where the pilot would have no knowledge of impending failure until the oil pressure dropped and the engine seized. Now, if a hit should be scored on a cooler in its new location, the pilot can switch to a bypass line which routes the oil past both coolers. This way he could probably get back to home base with his Corsair—and a tank of very hot oil.

▶**More Armor**—There had been armor plating in the -5, but the AU-1 got a lot more. Additional protection was included against fire from fore, aft and underneath. The pilot's seat bucket,

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cockpit flooring, airplane underside, engine and fuel pump areas and the fuel tank all are armored now. And in spite of the extra steelwork being carried around, the weight about breaks even. The armor plate increases were about balanced by the engine weight saving.

Armament data is restricted, as usual. But the picture shows five rocket pylons under the starboard wing, and presumably there are the same number under the port wing. What the guns are (judging by the external covering) is anybody's guess; but the chances are that they are a 20-mm. cannon quartette.

So the Corsair lives on. It's 12 years and 12,000 airplanes old. It's been a fighter, fighter-bomber for low- and high-altitude duties, a night fighter, a winterized fighter and a photographic craft.

Now it's an attack plane, and even there the chain doesn't break. The F4U-7 is being lined up for production for the French under Mutual Defense Assistance Program. It will have most of the features of the AU-1, and in addition, be suitable for work at higher altitudes.

How Smooth? GM Gage Tells

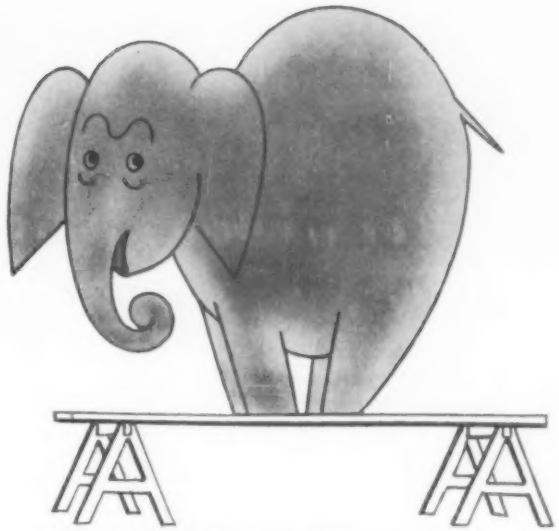
Checking surface finish of machined parts is the job of the Surfagage, a new portable instrument developed in the General Motors Corp. research labs and licensed for manufacture to an unspecified firm.

Surfagage is small—8 in. by 10 in. by 8 in. high—and can be taken anywhere in the factory where electric current is available. It's rugged enough to be used in routine production work, on the line, instead of in the inspection cribs.

There is a pickup on the Surfagage

Reckon we don't need a tree to handle a murderin' boss thief — take 'er up, Tex!

Hiller Copter News



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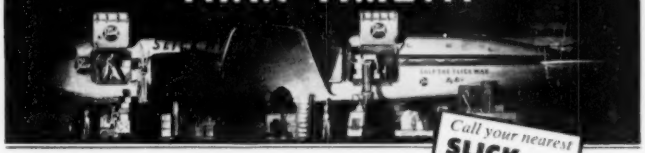

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NBS Study Explains Circuit Noise

Electrical "noise" generated in shielded cables by mechanical vibration and shock, which can be a problem in high-impedance electronic circuits, can be greatly reduced by a method developed by the National Bureau of Standards.

As a result of the investigation, NBS has developed a theory which it says explains this previously little-understood noise phenomenon. Several methods for lowering the mechanically induced noise by factors up to 200 to 1 have been devised by NBS and are described in detail in the Technical Report No. 1645.

THRUST & DRAG

Certainly the most mispronounced word in aviation today is aerodynamicist. There are six syllables in that word in its correct form, but an awful lot of people shorten it to "aerodynamist." Most aerodynamicists grit their teeth when their class appellation ends up short one syllable; it's like calling an engineer an engine or a metallurgist a "metalgist." Repeat: It's spelled aerodynamicist and pronounced "air-oh-die-nam-ih-sist."

* * *

During the 15 years' tenure of E. H. Heinemann as chief engineer at Douglas Aircraft Co.'s El Segundo plant, the United States has taken delivery on nearly 18,000 attack planes built to his designs. This terrific total is believed to outnumber the total of attack planes built by every other nation in the world.

* * *

Research in the United States is about four to five times as strong as it was before World War II, says Battelle Memorial Institute, Columbus, Ohio. The nation is spending almost six times as much on research in 1952 as it spent ten years ago. The reason six times the money only buys five times the research is explained by inflation; the reason the ratio is no worse than five for six is that increased efficiency of research has offset inflationary costs of research somewhat. —DAA

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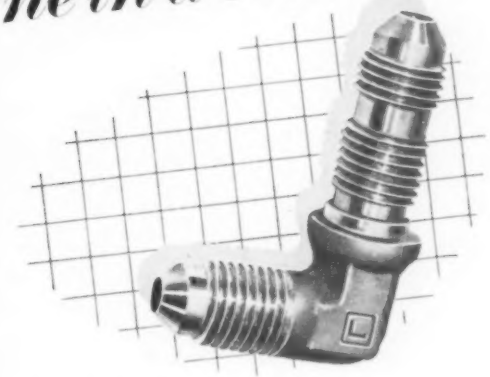

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PRODUCTION

AMC Procurement Pace Slowed

Recent scandals, political pressures, organizational changes, inexperienced new help all are factors.

By Byron C. Dempsey

Dayton—In recent months, the procurement operating level at Air Materiel Command has slowed its pace—with a resultant apathy that has been reflected in dealings with manufacturers' representatives and other contractor personnel visiting Wright-Patterson AFB. Facts are that the buyers and project engineers are scared of the gratuities situation, and will stay that way until someone in authority will define the word.

Then there are the procurement irregularity investigations—and these were and are handled badly by probers, in the view of AMC officials. Several cases have been revealed, there likely are others. All hinge on the word, "gratuity," which has become an anathema to industry as well as service personnel with whom industry does business.

▶**Contract Watchdogs**—Air Force contractors want no dealings with a buyer who would let a luncheon influence a contract award. Contractors reason that a competitor may walk in, buy the buyer two luncheons and walk out with a better contract.

And, industry is its own watchdog in many respects. Let some comparatively unknown outfit grab off a series of fat contracts and the competition in that field of production can be counted on to ferret out and report undercover manipulating.

Back of all these factors have been some recent organizational changes.

Research and Development, formerly done by the AMC Engineering division, was formed into a new command: Air Research and Development Command, with headquarters in Baltimore. The Wright Air Development Center here retains what amounts to the project engineering staff and testing equipment, while the ARDC procurement machinery is in Baltimore.

Primarily, AMC's role in the Air Force operation is to provide the best equipment available in adequate quantities to fulfill the Air Force mission. That means fitting military requirements to a budgetary allocation. When that operation literally is under one roof, the unfortunate parallel of an elephant trying to waltz is envisioned.

▶**How It Functions**—Largest of the internal factors, then, is the size of the operation, which determines the needs, does the buying based on that determination and sees that the purchased articles arrive at a given destination in shape to be functional, in the correct amounts and on a schedule that is so interlocking as to be detrimental unless all the varied cogs mesh properly. Example—Airframes are worthless without engines, and a sufficiency of the two is so much inanimate material without the electronic "brains" that go into the final assembly.

The Korean outbreak touched off a flurry of action in all departments. Funds immediately became available for a buying program which approached peak years of World War II. More than 5,000 officers and airmen were recalled to active duty and the command was given carte blanche to hire civilians on an unlimited basis.

This situation has been duplicated, with dire results, in many smaller industries. Along with highly specialized help, both military and civilian, came the inevitable incompetency that marks mushrooming operations in almost any sphere of action.

▶**Decentralization**—Conceding that AMC procurement is too large for its own efficient operation, the question of decentralization arises. For instance, why not set up a textile buying unit in New York, machine tools in either Detroit or Cleveland, etc.?

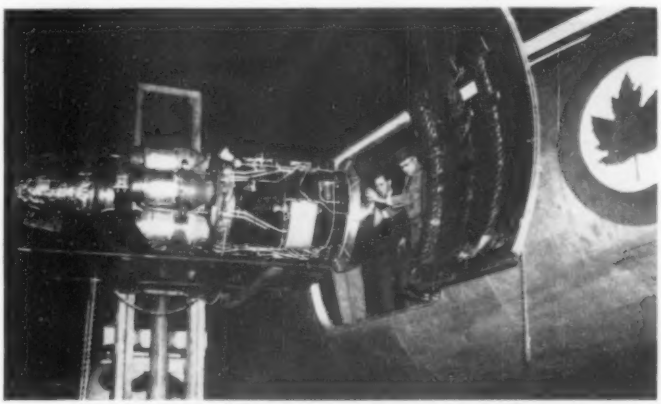
Although that is done by other armed service components, AMC will produce arguments that the necessary administrative costs far outweigh advantages. The same officials will cite the practical necessity of keeping procurement within easy access of project officers. A widespread decentralization would entail duplication of much expensive test equipment now located at AMC headquarters, Wright-Patterson AFB.

The external influences are unavoidable. Some are justified. Others are not. The biggest headache in the latter is pure political pressure.

Congress is populated with many representatives who have a great tendency to take the stump in behalf of a constituent without first ascertaining whether the voter has a just grievance.

▶**Politics Hurts Training**—Best illustration is in the recent Air Force program, sponsored by Air Training Command, to utilize private flying school facilities for basic flight training. That program was rendered more expensive and impeded for many months because of political pressure in connection with reactivating former bases and in behalf of owners of flying schools located in congressional districts.

Discussing budgets for months, then pushing legislation through in a matter of hours is another external source of irritation and a contribution to confusion in an organization trying to do the best job possible in the shortest time. When that time is shortened by



AVRO ORENDA DELIVERED TO SOLAR

Powerful A. V. Roe Canada Orenda axial-flow turbojet engine being unloaded from RCAF transport at Lindbergh Field, San Diego, is now used by Solar Aircraft Co. in developing an afterburner for the powerplant to increase its output further. Credited with more than 7,000 lb. of thrust normally, the afterburner unit should put the engine in the 10,000-lb.-thrust class. The Orenda powers the A. V. Roe Canada CF-100 all-weather fighter, now in large-scale production for the RCAF.

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From San Francisco to Bombay the familiar red "TWA" sign is truly the designation of a world-wide service . . . a service that reaches the four continents of North America, Europe, Africa, and Asia. TWA has been a leader in the development of post-war transoceanic aerial service . . . high-altitude, "over the weather" flight that led to introduction of cabin pressurization . . . and forwarded meteorological advances . . . the use of de-icer equipment . . . the automatic pilot and automatic direction finders. The result has been a steady increase of traffic over TWA routes. On the domestic side alone, revenue passenger miles have increased twelve-fold in the last twelve years. In 1940, the year Bendix* Radio equipment was first used by TWA, 156,000,000 revenue passenger miles were flown. By 1951, this had increased to 1,875,000,000. During this period of rapid growth and expansion TWA has continued to rely on Bendix equipment for dependable communication and accurate navigation.

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slow legislative processes, it imposes another hurdle along the route to building an adequate air defense.

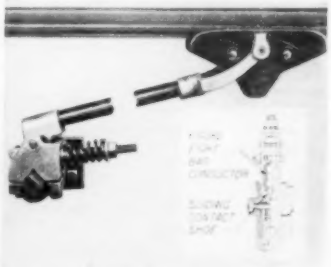
▶ **Progress Report**—AMC has noted progress in a number of directions—all designed either to add to efficiency or save operating costs. Some of them include:

• **Disbursing Offices.** Set up in each of the six procurement district offices, this system enables prompt payment after performance of contracts. It is estimated that approximately $2.5 million a year will be realized by taking advantage of contractual discounts. The former method of paying through one central office not only cost the government discounts, but was a source of irritation to contractors.

• **Re-refining Oil.** More than a million gallons of used aircraft engine oil was collected, re-refined by private contractors and put back into use at a savings of money and cut in the drain of the nation's petroleum supply.

• **Packaging Studies.** By means of a mechanical "private eye," enclosed in shipments, the Supply division was able to come up with some blow-by-blow data on the pounding various types of containers received when shipped lengthy distances. Findings are being applied to current shipping practices and are resulting in less damage. Considering that AMC handled 5.3 million tons of equipment last year, the savings can run into respectable figures.

• **Front Fixing.** A new emergency field repair system, adaptable to forward areas, is the Maintenance division's contribution to the march of progress. The method saves both time and money formerly expended on shipping back to rear bases and even to the States, for certain types of repairs.



Hazards Cut on Factory Trolleys

A new trolley system which can be adapted to existing figure-8-bar electrical conductors to make them safer is being installed at the El Segundo plant of the Douglas Aircraft Co., according to the developer of the equipment, Benbrow Mfg. Co.

The equipment, designed to rid

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NEW BENDIX AMSPEAKER

Relieves Fatigue . . . of Constant Listening Watch!

For the first time in the industry, Bendix* Radio is offering a simple, compact combination loud-speaker, amplifier and power supply. The combination design makes it possible to enjoy quickly the comfort, convenience and relaxation of cockpit speaker operation without involved installation problems. Just mount one near each crew member, connect 115 volts AC with audio and muting control from the crew-member's jack-box and the Amspeaker is ready for operation. Write for further details.

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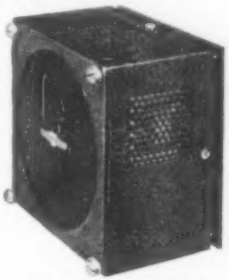

Dimensions: Approximately 6" square, 3½" deep. Weight: Less than 4 pounds.

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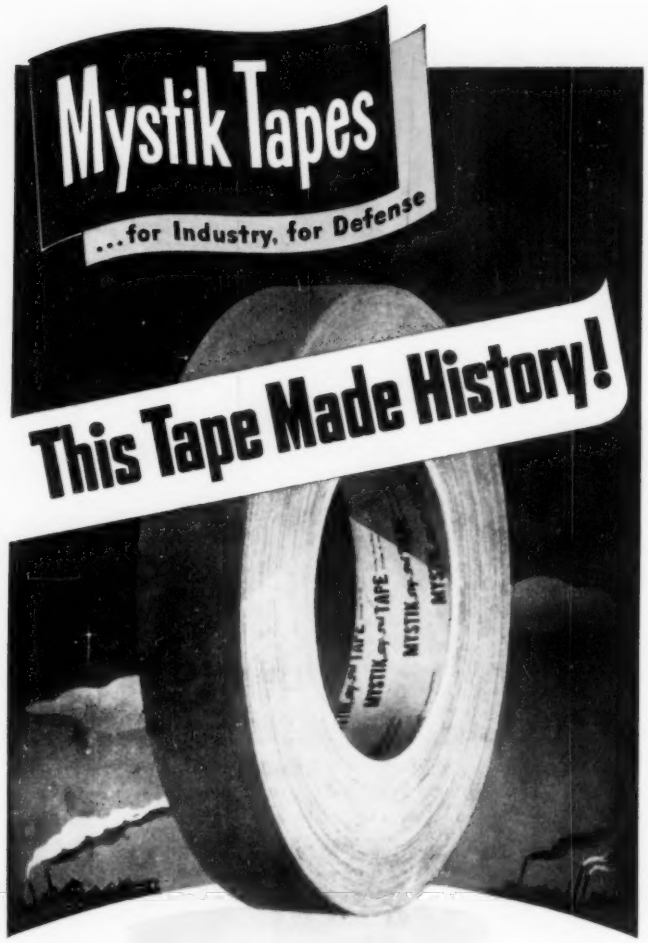
Export Sales: Bendix International Division, 72 Fifth Avenue, New York 11, New York
Canadian Distributor: Radio Engineering Products, Ltd., 4305 Iberville Street, Montreal, Quebec.



- Mystik Cloth Tapes
- Mystik Paper Masking Tapes
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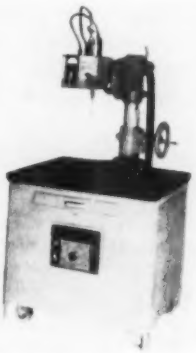
- Mystik Spra-Mask
- Mystik Sand-blast

When the chips were down in World War II, MYSTIK Cloth Tapes supplied 65% of the total needs of industry and the armed forces. Again MYSTIK has the answers to tremendous supply and protective shipping problems. Whatever your needs—protective or production—you can rely on MYSTIK Tapes to meet the toughest demands . . . government specifications or *your* specifications! Write for full information and samples now.
Mystik Adhesive Products,
2643 N. Kildare, Chicago 39.

industry of what Benbrow calls a "a hazard long recognized by safety experts," primarily involves: "snap-on" insulation which can be fitted over dangerously exposed S-bar conductors without dismantling; a new sliding shoe collector (like that on streetcars) which is held against the insulated S-bar conductor by spring action. The conductors normally power conveyors, bridge cranes, monorail hoists and similar apparatus.

Besides the gain in safety, a strong point in favor of the conversion equipment, called "Insul-S-Bar," is that it can be installed quickly and easily. One man can cover 100 ft. of conductor in less than 10 min., according to Benbrow.

Benbrow Mfg. Co., 1285 Rollins Rd., Burlingame, Calif.



Disintegrators Speed Die Repair

Disintegrator machines are knocking big chunks off salvage costs in aircraft plants, particularly in tool and die repair work.

Pratt & Whitney Aircraft, for example, which uses the "Thomas Metalmaster Disintegrator "has cut salvage costs from $35 to $8 per man, more than a 400% reduction, reports Gene Burch, director of research and development of the Clinton Machine Co.'s Warner division, the manufacturer.

P&WA now has 14 units in operation, Burch told AVIATION WEEK. Another company, he says, is saving $70,000 yearly in tool and die repair alone by using the disintegrators.

These machines, essentially electrical in operation, are built to erase production and engineering mistakes and facilitate modification work. Utilizing special electrodes, the machines cut hardened tools and die stocks without affecting temper or expansion characteristics of the material, Burch explains. Additional holes to meet a last minute design change can be made in a hard-

ened die, for example. Broken taps can be removed from work pieces—the job for which the Disintegrator originally was developed—and corrections in die shape often can be made.

Latest Metalmaster, the Model 952 recently introduced, meets Underwriters Laboratories approval, Warner notes. This unit is built to provide greater flexibility, convenience and service ease than preceding types. Electrodes can be produced in almost any shape, permitting almost unlimited application of the machine, Warner believes.

Warner division, Clinton Machine Co., 21535 Groesbeck Hwy., Detroit 5, Mich.

Surplus Labor Areas To Get Air Contracts

First implementation of Administration's policy to channel aviation and other defense contracts into labor surplus areas by giving firms in these areas preferential treatment has been approved by Munitions Board.

Meanwhile, Senate Small Business Subcommittee, headed by Michigan's Sen. Blair Moody, dissatisfied with the slowness in letting contracts in Detroit and other areas to take up unemployment slack, has launched hearings.

So far, 21 labor surplus areas in Illi-

Incomparable

a pretty girl

The Taj Mahal by moonlight . . . red sails in the sunset . . . the Isle of Capri at dawn . . . these and other fabled things pale into limbo against the dazzling splendor of milady's new bonnet on Easter morning. Stealing a peak in the mirror is Juanita Ransome, 26, hazel-eyed, brown-haired. She likes to ride horseback and has a Scotty dog named Smokey. (No. 7 in a series of pretty Dallas girls discovered and photographed especially for Southwest Airmotive).

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LOVE FIELD • DALLAS

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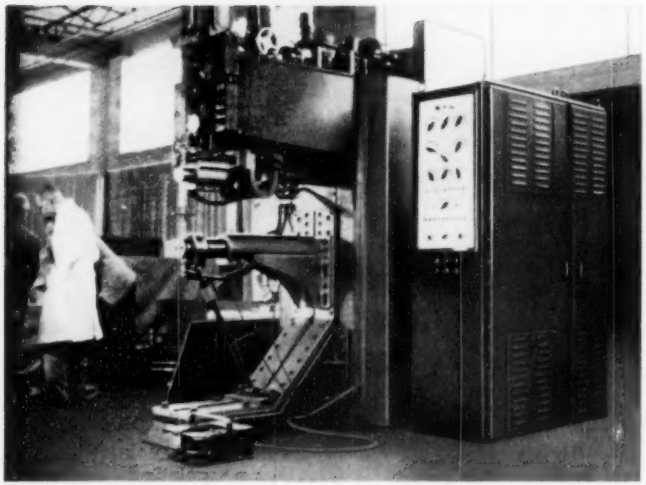
CONTINUOUS or SPOT WELDING of ALUMINUM

WELTRONIC 3-PHASE FREQUENCY CONVERTER



SCIENTIFICALLY DESIGNED AND BUILT FOR PEAK EFFICIENCY

The Weltronic frequency changer control operates in conjunction with a 3-phase welding transformer distributing the load over the three phases of the power supply. The lower reactive effect results in an extremely high power factor and a low KVA demand.

Frequency converter control minimizes overloaded distribution lines.

The three phase frequency converter type control provides a low rate of current rise which reduces spitting and tip pickup, thus providing improved weldability.

Reactance is controlled by a selector switch which in turn assists in the control of welding current. The reactive effect of the machine is reduced approximately in proportion to the reduction in frequency, providing the distinct advantage of being resistance sensitive.

Weltronic three phase frequency converter controls are available for all types of seam and spot welding operations.

Weltronic converters are in operation in a number of major aircraft plants.

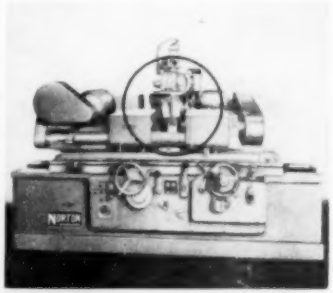
Complete information will be provided on request.

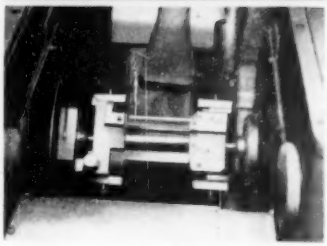
Weltronic Co. 19500 W. 8 MILE RD. Detroit 19, Michigan

nois, Maryland, Massachusetts, Michigan, New Hampshire, New York, North Carolina, Pennsylvania and Rhode Island have been designated for preferential treatment.

The Munitions Board directive doesn't authorize the payment of higher prices on contracts in labor surplus areas, but states that it may later authorize such price differentials. In the present order, MB simply affords surplus area firms the opportunity of meeting prices obtainable elsewhere:

- Blocks of competitive bid contracts may be held back for negotiation with firms in labor surplus areas. After receipt of competitive bids, the "set asides" would be negotiated with surplus area firms at prices equivalent to the lowest competitive bid obtained elsewhere.
- On negotiated contracts, when the "most acceptable" terms have been obtained, firms in labor surplus areas shall have the opportunity of meeting these terms.





Shapes Jet Blades

Latest in the line of production tools specifically for aircraft component work is the "Compound Contour Jet Blade Grinder," produced by the Norton Co in Worcester, Mass.

This machine is built for rapid, precise grinding of the external airfoil surface of jet engine parts, including blades, buckets, vanes, nozzles, and other items. Parts can, if desired, be ground in automatically controlled operations, removing the need for highly trained specialist at the machine, and assuring production uniformity, company say.

Blades are held on an arbor between

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North American Has Built More Airplanes Than Any Other Company In The World

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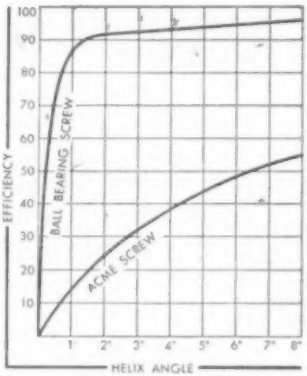
FRICTION-FREE TRANSFER OF ROTARY TO LINEAR MOTION

with Saginaw Ball Bearing Screw Jack

• Permits faster operation, forward or reverse • Requires less power • Compact design • Light in weight • Remarkably low maintenance • Practically unlimited in application

The Saginaw Ball Bearing Screw and Nut, up to 97% friction-free, and one of the most efficient means of transferring rotary into linear motion known today, is widely used in aircraft actuating devices. It is vastly superior in efficiency to the conventional Acme screw.

The Saginaw Ball Bearing Screw and Nut permits the use of lower horsepower motor drives in actuators, reducing over-all weight, gives faster operation with less heat generated, and allows rapid forward or reverse action with minimum friction. It is compact in design, light in weight—and requires very little maintenance.



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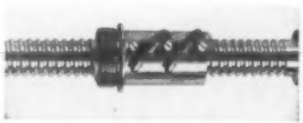
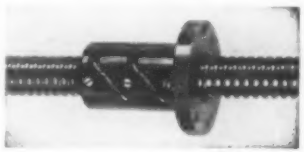
Aircraft applications of this actuator are many and varied. It operates satisfactorily under extremely high loads. Stroke and thrust are limited only by available power. Saginaw treats each application as an individual design, and is equipped to meet any desired production rate. Saginaw's engineering staff is one of the most highly trained and experienced in the entire field of manufacturing and its facilities are available to customers for assistance with their problems.

Write for Saginaw's new factual booklet on the ball bearing screw and nut principle.



Threaded-type nut. Two-circuit assembly.



Flange-type nut. Two-circuit assembly.

Address Saginaw Steering Gear Division, General Motors Corporation, Saginaw, Michigan.

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Tailored to fit!

That's the way Sprague likes to make radio interference filters for aircraft electrical and electronic equipment. Sprague filter engineers have a wealth of experience in designing ingenious mounting arrangements and case shapes to fit in cramped quarters. Moreover, the filters they design to meet these tough mechanical requirements have excellent insertion loss characteristics and are designed to withstand aircraft operating temperatures, vibration and shock beyond the stiffest specification limits.

Write today for help in solving your radio noise filter problems!

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FILTER DIVISION
SPRAGUE ELECTRIC COMPANY
NORTH ADAMS, MASSACHUSETTS

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synchronously driven, left-hand and right-hand shape-producing units which impart the figure "8" motion to the arbor for grinding blade forms. Blade design determines the number that can be held in the arbor at one time, certain designs permitting two or three blades to be accommodated. The arbor is removable, permitting the operator to speed work by loading one arbor while another is at work in the machine.

USAF CONTRACTS

Following is a list of recent USAF contracts announced by Air Materiel Command.

Aeroproducts, General Motors Corp., Dayton, spare parts, $100,000.

Arundale Mfg. Inc., 2823 Locust St., St. Louis, clamps, $99,619.

Bachman Wholesale Co., Rochester, aircraft parts & equipment, $92,887.

Barden Corp., Danbury, Conn., ball bearings, 15,000 ea., $42,750.

Bendix Aviation Corp., Bendix Products div., South Bend, wheel, brake assemblies, exceeds $250,000; bearings, exceeds $250,000.

Blackstone Mfg. Co., Inc., 4630 W. Harrison St., Chicago, rate of climb indicators, $86,000.

Bliss, E. W., Co., Canton, Ohio, presses, exceeds $250,000.

Boeing Airplane Co., Wichita, aircraft, exceeds $250,000; aircraft, exceeds $250,000.

Breeze Corps., Inc., 41 S. Sixth St., Newark, hose clamps, 986,000 ea., $128,180.

Burton Mfg. Co., 11201 W. Pico Blvd., Los Angeles, machinery & equipment, $65,000.

Certified Chrome Furniture Co., Inc., Los Angeles, shipping cases, $140,429.

Chase Aircraft Co., Inc., Parkway at DeCou, West Trenton, N. J., mobile training unit, 1 ea., $110,000.

Colson Corp., Elyria, Ohio, mop truck and data, 200 ea., $27,150.

Consolidated Machine Tool Corp., Rochester, vertical boring mill, 1 ea., $83,541.

Consolidated Vultee Aircraft Corp., Ft. Worth, balance computers, $148,743.

Deutsch Co., 7000 Avalon Blvd., Los Angeles, elbows, nipples, $167,178.

Dynamic Electronics, Inc., Glendale, L. I., N. Y., mounting, $26,396.

Eclipse-Pioneer div., Bendix Aviation Corp., Teterboro, N. J., spare parts, $99,371.

Goodrich, B. F., Co., Akron, deicer shoes, exceeds $250,000.

Heil Co., Milwaukee, refueling trailers, 275 ea., $42,017.

Ampco Metal Inc., Milwaukee, propeller cones, 15,442 ea., $76,596.

Auto-Lite Battery Corp., Toledo, batteries, 1,200 ea., $48,902.

Binkley Manufacturing Co., Main & Elm Sts., Warrenton, Mo., work bench, $122,300.

Bohn Aluminum & Brass Co., Detroit, forgings, exceeds $250,000.

Bristol Manufacturing Corp., Bristol, R. I., overshoes, flying, $685,348.

Consolidated Photo Engineering & Lithographing Equipment Co., 2155 Wabansia Ave., Chicago, kit, photo, $158,250.

DeLuxe Laboratory, Inc., 850 10th Ave., New York, prints, $30,000.

Detrex Corp., Box 501, Detroit, trichlorethylene, $132,000.

Douglas Chemical & Supply Co., 620 E. 16th Ave., N. Kansas City, Mo., isopropyl alcohol, $32,426.

Eastman Kodak Co., 342 State St., Rochester, photographic tissue, $27,285; photographic film, $761,196; photographic film, $27,475.

Eclipse-Pioneer div., Bendix Aviation Corp., Teterboro, transmitters, 3,000 ea., $134,482.

Enjay Co., Inc., 15 W. 51st St., New York, isopropyl alcohol, $35,688.

Fairchild Engine div., Fairchild Engine

When Nobody Knows the Answer

One of these days you may come face-to-face with a metal problem that does not seem to have an answer.

That is the time to think of these International Nickel Company metallurgists. They are constantly improving and modifying nickel alloys to meet new conditions. They are always ready to help you with specific problems involving metals for aircraft use.

Over the past 50 years, Inco has developed a family of metals for hundreds of different applications. In one branch of the family, for example, is a group of heat-resisting alloys—Inconel®, Inconel "X"®, the Nimonics and Incoloy®—all now important in the aircraft industry.

Elsewhere on the family tree, you will find other alloys—each with certain special characteristics. Often, there is a better-than-even chance that one of Inco's alloys offers exactly the properties you are looking for.

Of course, this does not mean that somebody at Inco can dip into the files and come up with a pat answer to every new problem. All the answers have not been found yet. But a tremendous amount of research has been done, and you can probably benefit in one way or another from it.

When nobody knows the answer, Inco's metallurgists keep going until they have investigated all possible metals and alloys that might do the job. In fact, the men in Inco's Technical Service (and in their Corrosion Engineering and High Temperature Engineering Services, as well) have one primary goal: to help you determine whether an Inco Nickel Alloy or some *other* metal will serve your purpose best.

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928 square inches of Pittsburgh Multiplate windshields

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General Electric Co., 1 River Road, Schenectady, N. Y., spare parts, $57,844; welders, $25,548; indicators, exceeds $250,000; indicators, 1,205 ea., $91,386.

General Products Co., Mayfield St., Fredericksburg, Va., storage tanks, $60,000.

Gerity-Michigan Manufacturing Co., Adrian, Mich., magnesium castings, $25,000.

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Gordon Instruments, 6009 W. Pico Blvd., Los Angeles, mount assembly, $31,303.

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Hudson Pulp & Paper Corp., 505 Park Ave., New York, tape, sealing, $157,290.

Industrial Tape Corp., New Brunswick, N. J., tape, adhesive, $224,800.

Kindred Aviation Corp., 4015 Magnolia Blvd., Burbank, Calif., parts & equipment, $51,816.

Kollsman Instrument Corp., Elmhurst, N. Y., indicators, exceeds $250,000.

Lewis Engineering Co., 339 Church St., Naugatuck, Conn., indicator, temperature, $27,100.

The Liquidometer Corp., Skillman Ave., 26th & 37th Sts., Long Island City, N. Y., instruments and component parts, $104,983.

Marlin-Rockwell Corp., 402 Chandler St., Jamestown, N. Y., ball bearings, $58,366.

Mystik Adhesive Products div., 2635 North Kildare Ave., Chicago, tape, adhesive, $665,295.

National Lead Co., 841-659 Freeman Ave., Cincinnati, zinc alloy, $100,000.

National Machinery Co., Tiffin, Ohio, heavy drop presses, exceeds $250,000.

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Packard Motor Car Co., Detroit, engines, exceeds $250,000.

Pesco Products div., Borg-Warner Corp., Bedford, Ohio, maintenance parts, $46,656; maintenance parts, $67,312.

Racon Electric Co., 52 E. 19th St., New York, cover, weatherproof, $39,700.

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Ronan & Kunzl, Inc., Marshall, Mich., tank, oxygen, 19 ea., $111,544.

Rosenberg, H. Z., & Co., 701 Seneca St., Buffalo, N. Y., parts & equipment, $122,876.

Star-Kimble Motor division, Miehle Print Press & Mfg. Co., Bloomfield, N. J., motor generators, $31,655.

Steel Improvement & Forge Co., Cleveland, machinery and equipment, exceeds $250,000.

Studebaker Corp., South Bend, Ind., engines, exceeds $250,000.

Sysco Mfg. Co., Inc., 82 Herman St., E. Rutherford, N. J., rectifiers, 30 ea., $27,784.

Titeflex, Inc., 500 Frelinghuysen, Newark, N. J., miscellaneous spares, exceeds $250,000.

Transport Products Corp., 120 South Campbell St., Louisville, Ky., indicator box, $31,918.

U. S. Burke Machine Tool Co., Cincinnati, machines, milling, $123,750.

Western Electric Co., 120 Broadway, New York, transistors, $45,000.

Westinghouse Electric Corp., 32 North Main St., Dayton, generators, exceeds $250,000; generators, $47,756.

Whitaker Paper Co., 210 E. Saratoga St., Baltimore, blotting paper, $32,361.

Wilcox Electric Co., Inc., 1400 Chestnut St., Kansas City, Mo., antenna, $85,528.

Willys-Overland Motors, Inc., Toledo, aluminum forgings, $96,000.

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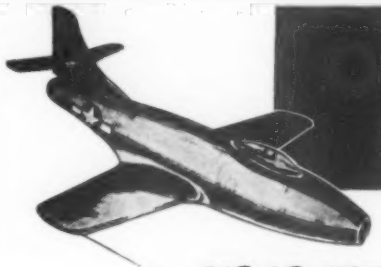

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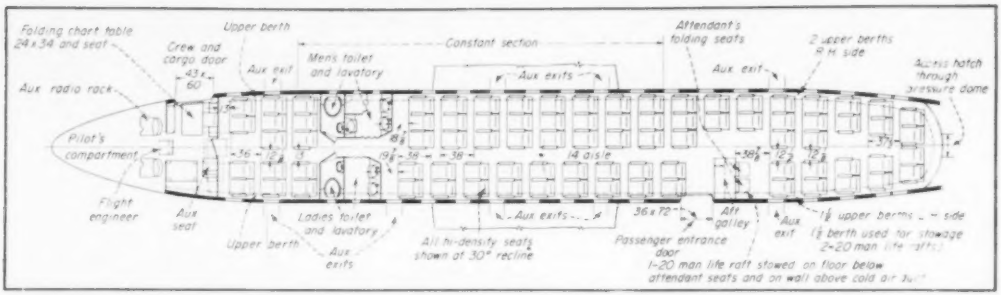


PAA's Tourist Cabin, De Luxe Cockpit

- **DC-6B for ocean coach converts to luxury plane.**
- **But fully instrumented cockpit stays the same.**

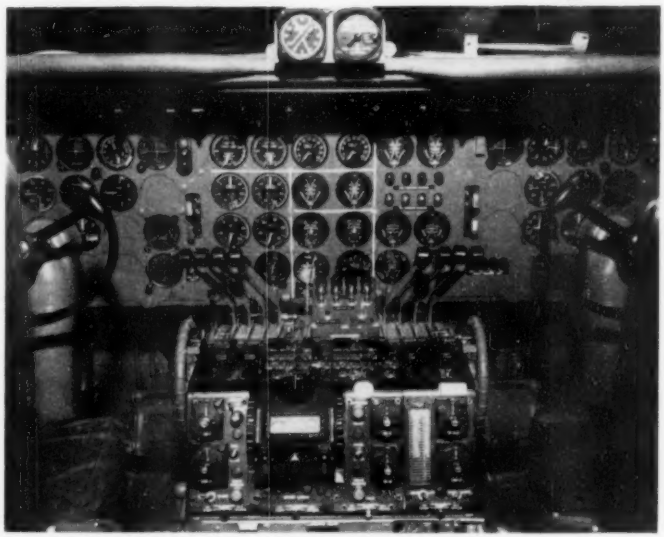
By Scott H. Reiniger

For a new concept in trans-Atlantic air travel—the tourist service beginning May 1—Pan American World Airways is putting into service a fleet of 39 Douglas DC-6Bs which in many respects represent a new concept in transport aircraft.

Two major revisions set PanAm's DC-6Bs apart from other planes of that model. If the tourist traffic does not develop as anticipated, PanAm can convert its 82-passenger tourist DC-6Bs (which the carrier calls Super 6) overnight into 44- or 56-passenger luxury transports. And the Super 6, either as a tourist or a first-class plane is perhaps the most completely instrumented aircraft ever to take to the civil airways.

In addition, the performance of PanAm's DC-6Bs is superior to previous models of that plane. Gross weight is 107,000 lb., range increased by 800 miles. The four Pratt & Whitney R-2800-CB17 engines each develop 100 hp. more at takeoff than present DC-6B engines.

Pan American's Douglas Super DC-6B may be tourist in cabin appointment, but it is super de luxe in cockpit appointment. According to Sperry Gyroscope Co., "it is the most completely equipped airliner for air-ground communication and electronic navigation" flying today in commercial service. The instrument panel embodies the latest in technical advances. It is the first in which PAA's ideas on how an instrument panel should be arranged have been fully implemented, say PanAm's engineers. Layout is based on long studies of pilot efficiency and fatigue factors. It does not necessarily jibe with CAA viewpoints on the subject.



COMPLETE RADIO CONSOLE (foreground) is only one innovation in instrumentation.

▶ **Sperry Orders**—With Sperry alone PanAm probably will spend well over $1 million for cockpit gear by the time it outfits its entire fleet of 39 DC-6Bs. It already has spent almost $½ million, excluding spares, for the first 20 planes.

Radio controls are arranged more neatly and compactly than has been done before on ocean-hopping craft, weighted down as they are by radio gear. These controls for the most part are combined in a spectacular display on the top of the control pedestal between the pilot and co-pilot. In some respects, PanAm's DC-6B cockpit is better equipped than its Stratocruiser, the carrier says. The 377, for example, doesn't have mounting provisions for distance measuring equipment, nor is it equipped fleetwide with the Sperry Zero Reader for guiding the pilot into a field when the weather is shut in.

The DC-6B also has Sperry's automatic approach coupler and the Bendix Ommimag. The Zero Reader primarily gives steering information, while the Ommimag gives PanAm position or displacement information.

The Super 6 is the first transport with both Zero Reader and auto approach coupler.

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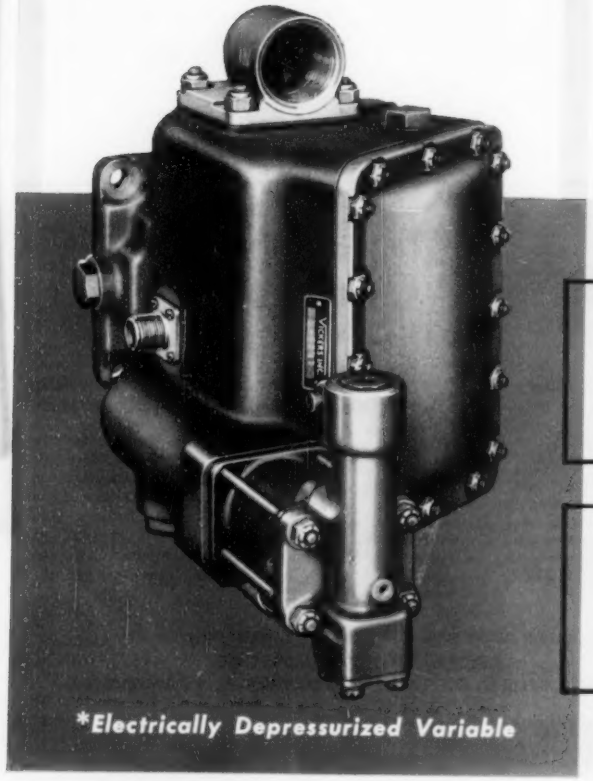
The new Vickers EDV Pump is a variable delivery, piston type pump which automatically delivers the hydraulic fluid at rates from zero to full rated volume . . . governed by the demand of the load. In addition, an electrical control latches the pump at zero delivery and pressure when no fluid is required. The instant there is any demand, the pump automatically delivers the volume of fluid required at full pressure.

This arrangement has many advantages, particularly on long flights. In the first place, the power required by the pump in the "latched zero" position is negligible. Fuel savings in the order of 700 lb per flight have been estimated. This saving can be used to increase pay load or to extend range.

As the pump does not circulate any fluid in the "latched zero" position, if any line is damaged (e.g. by gunfire) fluid loss is confined to that line . . . the pump does not empty the reservoir.

The pump is not stopped in the "latched zero" position . . . it operates at normal speed but at no load. It is ready the instant demand occurs . . . nothing has to be brought up to speed. Other advantages are low maintenance costs and longer periods between overhauls. It can often simplify hydraulic systems. For additional information on the Vickers EDV Pump, ask for Bulletin A 5202.



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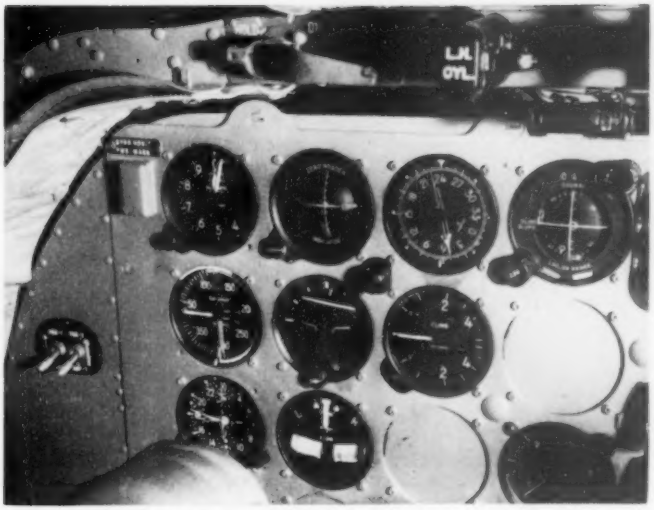


ZERO READER gets choice spot on PanAm panel (top row, second from left). Bendix Omnimag is at extreme right, with space below it for DME indicator.

service by PanAm marks the first large fleet use of the Zero Reader in commercial service. A small fleet of about five DC-4s working PanAm's Alaska routes, however, has made use of the Reader for some months now.

The Super 6 also uses Sperry's engine analyzer, developed originally by a PanAm engineer, but this is standard on all PAA's planes. The scope and switches for the analyzer, which detects faulty engine operation during flight and puts its finger on the cause, is located on an auxiliary radio rack, to the right and slightly above the head of the flight engineer who sits on a track-mounted sliding chair in the aisle just behind the pilot and co-pilot.

▶ **Why Both**—Here are the reasons PanAm gives for using both the Zero Reader and the automatic approach coupler (it says some airlines don't agree with the need of having both): Both the Reader and automatic approach system are fed the same steering information from a common computer. In one case, the human pilot handles the controls, guided through bad weather by keeping the Reader on the "bullseye"; in the other, the autopilot operates the controls. The automatic approach system permits operation in lower weather minimums than would be wise under manual control with a simple crosspointer bearing displacement indicator.

Failure of the automatic system in bad weather might tend to "free" the pilot. But the Reader then gives the same steering information that was fed to the autopilot before failure.

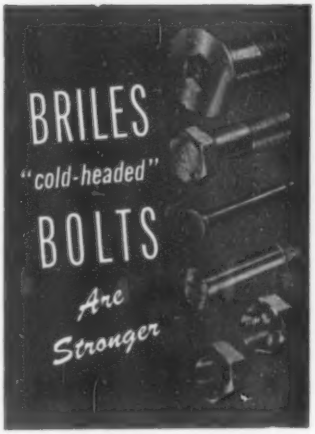
Thus, in an emergency, the Zero Reader would become a primary instrument. It is therefore placed in a prominent position at the top of the panel, one of the choicest positions, where it is easy for the pilot to watch it and at the same time search through the windshield for sight of the runway.

While the arrangement of the flight instruments is to PanAm's specifications, and radio controls have been consolidated more than usual on the pedestal, the other instruments, switches and controls follow pretty much the pattern found in other DC-6s.

▶ **Radio Gear**—No other planes in the PanAm system are as lavishly equipped with radio gear as the Super 6. Most of it, transmitters and receivers, are located aft of the pilot and co-pilot in floor-to-ceiling consoles which serve to split the flight deck in two—cockpit forward, navigator compartment aft. The flight engineer slides back and forth between the two areas down the center aisle on a track-mounted chair.

The radio gear includes:

- **HF radio telephone.** Dual transmitter-receivers, Type 1883, 20 channels. This is temporary, to be replaced by multi-channel sets that include some novel features that PanAm hints will have considerable impact on radio telephony techniques.
- **HF tunable receiver.** Supplementary set, 2 to 20 mc.
- **VHF communication dual arc** 1 transceivers modified to 50 channels. PanAm says it won't buy newer sets until some questions on the VHF communication spectrum are settled. There is talk of splitting channels on



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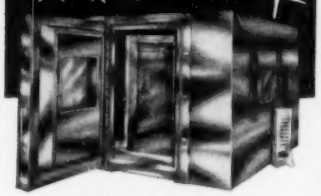

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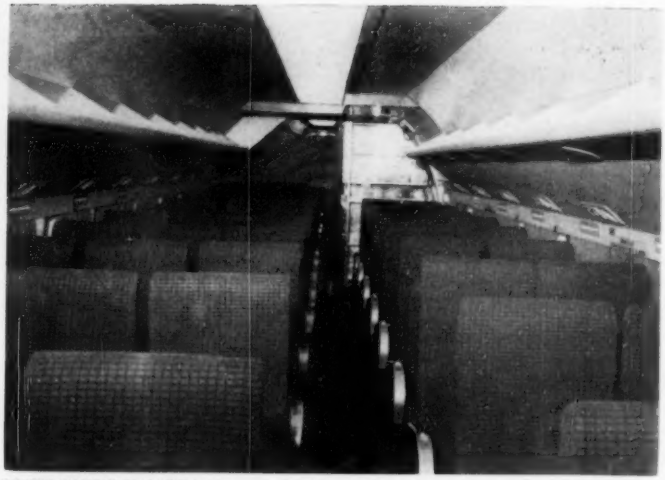


MAIN TOURIST CABIN accommodates 71 with five-abreast seating. Removable seats are lighter and narrower than counterparts in the luxury version.

a 50-kc. separation basis while some of the newer VHF transmitters have been designed around a 100-kc. separation basis.

• **VHF radio navigation.** Dual 280-channel VHF communication-navigation receivers and full instrumentation, either Collins 51R-1 or -2 receivers or Bendix MN-85B receivers, depending on availability. While these sets provide extensive VHF reception coverage, PanAm bought them primarily for Omnirange and ILS navigation (localizer), its engineers told AVIATION WEEK.

• **VHF automatic direction finder** (ADF). Dual receivers, Bendix MN-62A.

• **Marker beacon.** Single Bendix MN-53B receiver.

• **Glideslope** (ILS). Dual 20-channel receivers, Collins 51V-2s.

• **Loran.** Single R-65/85PN-9 set; high range altimeter (oscilloscope on navigator's panel)—single SCR-718 radar set; low range altimeter (FM)—modified Raytheon cx-1100, equivalent of APN-1 set.

• **Distance measuring equipment** (DME). Mounting provisions and wiring for Federal DIA set when available.

▶ **Fire Protection**—The new DC-6Bs are among the first planes in this country to be protected by an automatically operated engine fire extinguishing system in event of a crash. It will be triggered by an inertia switch which is actuated on crash impact. This feature, long favored and used in England, was given close scrutiny before acceptance in this country because it was feared it might go off at the wrong time. Evidence from England indicates the crash switch has been effective there.

SPECIAL TRACKS on floor make removal or adjustable spacing of seats easy.

This impact switch is made by Walter Kidde & Co., Inc.

Another safety feature is the use of Skydrol, a non-flammable hydraulic fluid, developed jointly by Douglas and Monsanto Chemical Corp.

Other safety measures include: PanAm-designed lightning rods; positive propeller reversing indicator lights; generator overheat warning; special "safety" gust lock installation; special lining for inboard fuel cells; and emergency lighting system operated by impact switch.

▶ **Seats**—Keystone of the Super 6's versatility is the universal floor. Special tracks in the floor, running the length of the cabin, permit Sleeperette or Tourist seats to be speedily removed or installed at any spacing desired. Adjust-

ment is in one-inch increments. PanAm claims to hold a patent on the floor design.

Both seats and tracks in the Douglas craft are built to withstand 10G crash loads, well beyond CAA requirements. Following Crash Injury Research recommendations, no tubing is used where the head is likely to strike. Top of seat backs is formed of sheet metal designed to "give" on impact and absorb head blows.

Another CIR proposal adopted: Seat backs are built to collapse forward at a specified crash load. PanAm also has them so they can be folded forward to make a more convenient package to handle and to give ground crews more space when working in cabins.

Seats are custom built by Aerotherm Corp., Bantam, Conn. and use "Texfoam" cushioning. This is said to be stronger and 20% lighter than other cushioning materials of comparable quality. Texfoam is made by Sponge Rubber Products Co., Shelton, Conn.

► **Comfort**—Seats for Sleeperette service have extra recline (65 deg.) and adjustable leg rests; they are spaced almost five feet apart (57 in.). Tourist seats are simpler, somewhat narrower (17 in. between arm rests, 19 in. deep.), and are lighter than their luxury counterparts. They don't have leg rests, being spaced about 38 in. apart. But there is enough room underneath seats in front for a passenger to extend his legs.

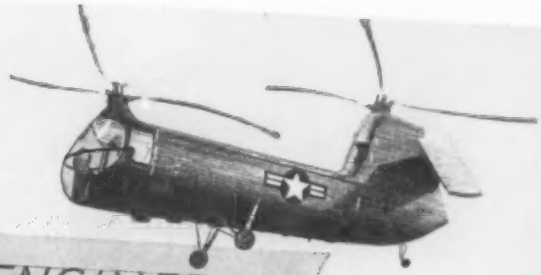
More seating room can be gained in the triple tourist seats, on the right side of the cabin, by using the push-button to retract the armrests in the center.

Instead of using leather or painted sheet metal, sides of the seats are covered with molded "Bolteron," a plastic product made by Durable Formed Products Co. This saves weight, is designed better to resist scuffing and dents, Aerotherm says. Seat frames are made of welded magnesium tubing.

The tourist Super 6 is divided into two passenger areas, a forward compartment, seating a maximum of 14 persons (12 in transoccan flights), separated by the lavatories from the main cabin which seats up to 71 people. Entrance to the plane is through the left side of the fuselage, aft of the wing. Here, aft of the door is a miniature galley, just large enough to stow one simple meal for everyone and some coffee. Coats are stowed in overhead baggage racks running the length of the cabin.

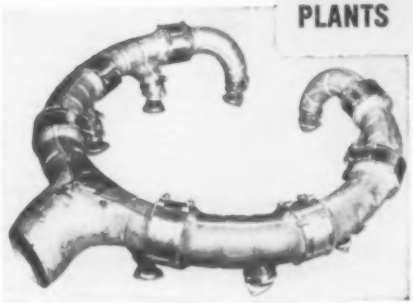
Two toilets are in separate compartments equipped with an extra wash basin. In addition there are two lavatories fitted with several wash basins each to handle the high-density load. Exterior walls of the lavatories are panelled in "Flexwood," a product of U. S. Plywood Corp.

Color scheme of the cabin is blue,



ENGINEERS NOTEBOOK

POWER PLANTS



Multiple Take-up Clamp Simplifies Shroud Connections

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Locking pins in Hansen Push-Tite Coupling Socket afford large area contact with plug, thereby preventing wear and subsequent leakage.

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330 West 42nd St., New York 18, N. Y.

yellow and grey in varying shades. Blue floors are covered wall to wall with good-looking Vinyl plastic rings (RON-18) developed by B. F. Goodrich in conjunction with PanAm standards engineers. They are tough and easy to clean. A sponge backing makes the rugs resilient and acts as a sound deadener.

Avtrim, a plastic with cloth backing, made by Goodrich, is used extensively on walls, grey up to window level on the dado panel, yellow above. Collins & Aikman, a New York fabric house, supplies the window curtains, a heavy wool "Coral Montrose" material, and the seat covers, a blue nylon fabric called "Nyplaid."

▶ **De Luxe Version**—The Super 6 Clipper can quickly be stripped bare of its tourist furnishings and luxuriously arrayed for the carriage trade. Douglas representatives told AVIATION WEEK actual trials show this can be done in less than 1½ hr.

To appreciate how vast is the change wrought in so short a time let's say you already have seen the tourist Clipper and now are entering the plane after its conversion to a luxury model. You no longer can see forward in the cabin as you come through the main entrance. A large galley, curtained off, blocks your view. You are in what amounts to a foyer. In place of seats directly across the aisle there now is a coat room and a stewardess waiting to take your hat.

Next thing you notice is that it is softer underfoot. Rich 100% wool carpeting rests on top of the plastic rugs used for tourist service. The aisles are wider. The main cabin has been cut into two by the galley and coat room.

In back, you see berths where there were coat racks, a seven-place lounge and bigger "Slumberyde" seats, all two-place. Seat areas can be individually curtained off. Only 14 persons use this rear compartment.

Up front in the main cabin are seats for 22 persons, with the same accommodations as in the rear, except there are no upper berths. Farther forward, past the lavatories, eight persons can be seated where there was room for 14. Two upper berths have been added.

The galley bar, three times the size of the smaller galley section aft of the main door, is just another of the accessories rapidly installed along with seats and other gear.

The galley, made by Mansfield Aircraft Products, Mansfield, Ohio, can store two first-class meals for each of 56 passengers. Besides the bar, two ovens are built in for actual cooking and for heating precooked meals. Galley also has a refrigerator, sinks for washing, water containers, electric hot cups and other kitchen gear.

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Eyes of flight—the PLEXIGLAS canopies, domes, noses, windows on today's fighters, bombers, transports, helicopters. Through these transparent shields against wind and weather, the men who fly our country's planes obtain their all-important unobstructed view.
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Every Top Management Man... In Every Industry

SHOULD BE ABLE TO ANSWER THESE QUESTIONS ABOUT A MOST CRITICAL EMERGENCY IN OUR COUNTRY'S AFFAIRS

Q. Why is iron and steel *scrap* a matter of importance to me?

A. Steel for our country's military program and civilian economy is being produced at the annual rate of 107,000,000 tons in 1951 . . . 119,500,000 tons expected in 1952. Steel-making capacity is being increased now to meet those quotas.

What Do I Get For My Scrap?

In addition to being paid for your scrap, you remove nuisance inventory from your plant—saving valuable floor space. Also, you have a better chance of *getting* new steel or steel products. But, *most important*—you help alleviate a dangerous condition threatening our country's capacity to rearm and satisfy civilian requirements at the same time.

Q. How does scrap figure in the production of steel?

A. Steel is composed, generally speaking, 50% of pig iron, 25% of "production" scrap (that is, the scrap which is produced as a by-product of steel-making) and 25% of "purchased" scrap.

Q. Is scrap getting scarce?

A. Yes. The supply of *purchased* scrap is not increasing fast enough to meet the needs of increasing steel production.

Q. What if the needed scrap isn't obtained?

A. Open-hearth furnaces will not be able to operate at capacity. That will mean a loss of steel production . . . and fewer products made of steel.

Q. Why not use pig iron instead of scrap?

A. Every ton of scrap conserves approximately 2 tons of iron ore, 1 ton of coal, nearly ½ ton of limestone and many other vital natural resources—to say nothing of the extra transportation facilities that would be otherwise required.

Q. How can *more* scrap be furnished?

A. By everybody pitching in—as we always do in every emergency—and searching out all possible sources of scrap.

Q. What are these sources?

A. Metal-fabricating plants normally turn over to scrap dealers the scrap left from machining. But there's not enough of this to fill our present enormous need. So everybody—both in and out of the metal-fabricating industries—must sell scrap in the form of *idle metal*.

Every pound of idle metal is needed to keep our steel mills operating at top capacity. Sell your idle metal to a local scrap dealer right away.

What Do I Do *First*?

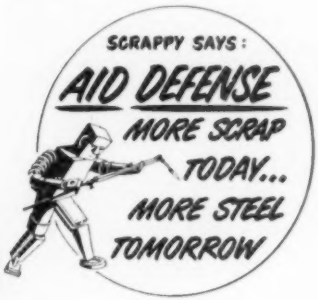
Write for free booklet. It tells how to set up a Scrap Salvage Program in your plant. Thousands of plants are cooperating. Do your part now! Address Advertising Council, 25 West 45th Street, New York 19, N. Y.

Q. *We* don't *produce* scrap—how can *we* help?

A. Scrap is any kind of iron and steel that's gathering dust—obsolete machines or structures, jigs and fixtures, pulleys and wheels, chains and track, valves and pipe—*anything* with rust on it or dust on it. Non-ferrous scrap is needed, too.

Q. What do we do with it when we find it?

A. Use your normal channels or get in touch with a recognized scrap dealer.



This advertisement is a contribution, in the national interest, by

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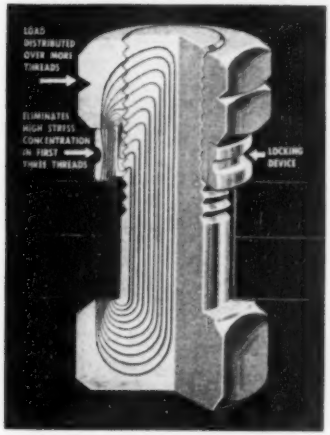
NEW AVIATION PRODUCTS



Tough Nut

A promising new contender for the eyes of aircraft design engineers looking for a part that will take rough going in flight is the Klincher Locknut.

The nut, a seating type, reusable many times over and made in stainless steel and other alloys. It can meet stringent jet engine and other aircraft applications; it takes in stride temperatures up to 1600F, and Arctic cold, too, says its maker. Some other features:

- **Tenaciously bites** into bolt against extremes of vibration, yet gives decidedly superior protection to bolt threads compared to that given by most other aircraft nuts, according to the firm.
- **Spins freely** down to work, despite tight locking feature.
- **Breads down** high loads normally found at first three threads on bolt and nut. And because loads are more widely distributed over all threads more wrench torque can be applied before exceeding elasticity of bolt.

These advantages are accredited to the special, locking construction of the nut.

The assembly is in two parts, press-

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DUCTS, SLEEVES, COUPLINGS

NEW COMPOUNDS and new fabrication techniques developed at Arrowhead give "extra" abilities to ArcoSil silicone-Fiberglass ducts, sleeves, couplings. These improved characteristics of parts made from Arrowhead's *new* ArcoSil #2184 offer still greater design possibilities in applications where flexibility and serviceability are required at extreme temperatures.

Investigate Arrowhead's new miracle material, ArcoSil #2184 for the solution to your design problem. Arrowhead sales engineers will be glad to provide further information and engineering assistance.

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Write for additional details on ArcoSil #2184 and name of nearest Arrowhead representative. Dept. S-300.

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AIRTRON DUCTS
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For complete engineering specifications and counsel, address ADEL DIVISION, GENERAL METALS CORPORATION, 10775 Van Owen St., Burbank, California.

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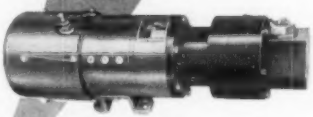
Intermittent 24 V.D.C. motor.
Weight 7.5 lbs.



#23383 PROP FEATHERING PUMP

5 G.P.M. at 1000 P.S.I.
Intermittent 24 V.D.C. motor.
Weight 21.0 lbs.

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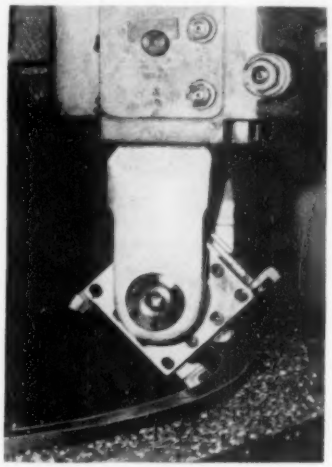
fitted together. It consists of the nut proper, and a grooved washer, pressed onto the thin-walled, threaded section at the bottom of the nut.

Here is the locking action: Wrench torque compresses the washer, causing the thin-walled area it encircles to move inwards and lock radially and axially to the bolt. When the thin, threaded section has taken all the load it can stand, it elongates slightly, permitting the bulk of the load to move up into the main body of the nut. Consequently, the high stress concentrations and torque loads on the first three threads nearest the work are reduced, and in the end, the capacity of the nut to take high wrench torque loads is raised.

Klincher Locknut Corp., 2132 Hillside Ave., Indianapolis, Ind.



Tool Reduces Setups

A new tool holder built to speed production by eliminating much setup work connected with vertical boring and turning mills, has been developed by the Davis Boring Tool division of Gidding & Lewis.

The holder accommodates four different cutting tools at once, enables the operator to turn, undercut, bore and chamfer in one setup. A simple wrench adjustment permits it to be rotated to any of eight positions, through a full circle in 45-deg. steps. The holder is held in the selected position rigidly and accurately, says the company, by a locking and index pin arrangement. "A mere twist of the wrist and you have positioned the cutting tool for the next operation," it explains.

Davis Boring Tool div. of Giddings & Lewis Machine Tool Co., Fond Du Lac, Wis.

Scrap Makes Steel

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The most advanced production methods are in operation . . . senior personnel have been drawn from the best sources throughout the globe . . . millions have been invested in the latest equipment . . . all meeting today's exacting demands of aircraft manufacture.

Here Canadair has produced many 4-engine airliners, is producing F-86* Sabre jets and preparing for quantity production of jet and conventional engine trainers . . . *Canadair is as modern as the planes she builds.*

*Made under license from North American Aviation Inc.

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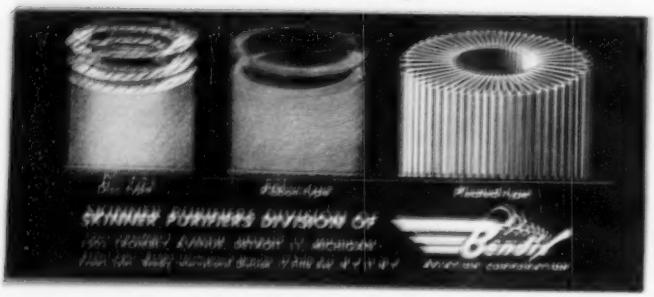

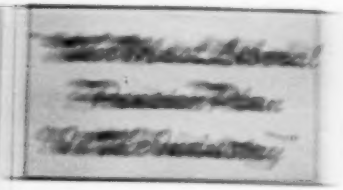

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Where you will find THE REAL REVOLUTION

"If we keep in mind the values of opportunity, competition, democracy, productivity, then it is our capitalist society which is the truly revolutionary one – the only society which offers true hope to the masses for release from the long nightmares of tyranny. It is we, not the Marxists with their reactionary ideas of the good dictator, who have the truly constructive, the truly revolutionary ideal."

– from "Capitalism" by David McCord Wright.

If we can only win recognition of this truth, we shall win the struggle of free men against communism. This editorial discusses some of the hurdles that must be cleared.

To win the needed recognition that "our capitalistic society... is the truly revolutionary one," we must keep pounding away both abroad and at home. That is because the communists simultaneously attack us on an international front and try to undermine us from within.

The present drive to rearm ourselves and our allies is crucial to our self-protection on the international front. We must be prepared to meet the armed force of aggressive communism with armed force if we are to secure our physical freedom.

Arms are not enough

But to re-establish parity in arms is only half of the battle. In the last analysis it is not the more important half. To be effective, our arms must be backed by loyalty of men to our ideals. So, both abroad and at home, we must win men to the faith that we do have "the truly constructive, the truly revolutionary ideal."

On the international front, the effort to win adherence to such faith in our capitalist society meets tough going. That arises from the fact that in some of the countries that are allied with us in the fight against communism, capitalist society has offered to its people no such ideal. In varying degrees "the values of opportunity, competition, democracy, productivity" – those key aspects of American capitalism–are either absent or subordinated in their economic life. Indeed, the *Wall Street Journal* recently remarked that "to the European, capitalism has become synonymous with cartels – and with the disregard cartels foster for the consumer, the worker and the over-all well-being of the nation's economy."

No Simple Solution

Nonetheless, many European labor and governmental leaders sincerely believe that cartels are essential to their economic salvation. They believe that without such restrictions in congested European markets there would be intolerable cut-throat competition and instability of employment. Thus, when we point out that the cartel capitalism so prevalent in Europe lacks the constructive qualities of competitive American capitalism, we may offend European leaders whose wholehearted cooperation we need in the fight against communism.

But, if we soft-pedal that contrast, we sacrifice the opportunity to win understanding and loyalty from millions of Europeans who have had no chance to learn that capitalism can be the constructive and liberalizing force that it is in the United States. Indeed, when many of these millions embrace socialism it is not because they love it. They are rather desperately seeking a tolerable middle course between what they consider the hateful extremes of communism and the undesirable aspects of capitalism as they understand it.

New name not the answer

We know that there is no easy way to handle the problems created by such misunderstanding of American capitalism. Neither do we share the belief that much of the difficulty would be overcome if we were to call American capitalism by some other name. By doing that, the argument runs, we shall relieve it from the unpleasant connotations that are attached to the word capitalism in some other parts of the world. But, after all, if we are to give up all the terms that have come to mean something else in other parts of the world, we must begin by ditching the term "democracy" which, in the official jargon of the Kremlin, seems to mean what we call dictatorship.

In spite of the difficulties, however, we must stick to this job of exporting the truth that our capitalist system does offer opportunity, competition and democracy. We must let the rest of the world see that it means a continuous drive for increased productivity, and the search for profits by increasing sales and consumption, not by trying to sell less for more.

Export alone not enough

The spreading of truth about American capitalism will not be effective if it is merely directed abroad. Unless it is carried on at home also, it will lack the driving faith that is essential to any convincing export of this type. Nor will export alone come to grips with the communist attack on our country from within—an attack that gets too much help from loyal Americans who short-sightedly repudiate the basic principles of our institutions in their efforts to reform some of their deficiencies. For success both at home and abroad, we must have right here at home a much more militant recognition that it is in fact our capitalist society which offers "the truly constructive, the truly revolutionary ideal."

Here at home, too, this raises difficult complications. Businessmen who are among the leaders and principal practitioners of capitalism, have generally been catalogued as conservatives. Hence, many people must stretch their imaginations a bit to see that businessmen are leaders of a development which has so greatly and so rapidly improved the lot of free men in America that it is truly revolutionary.

These difficulties of definition, however, are relatively superficial aspects of the problem of seeing our capitalist society clearly. The basic facts are that:

American capitalism is leading free men to an ever higher material standard of living while respecting their spiritual, social and political freedom.

Communism is leading its people back into a life of servile regimentation under dictatorship.

American capitalism advances to high ground never before attained by free men. Communism retreats to ground that men with an appetite for freedom throughout the ages have sought to escape. If we can establish this truth firmly, around the world, we shall no longer need to worry about communism. It will be hopelessly sunk.

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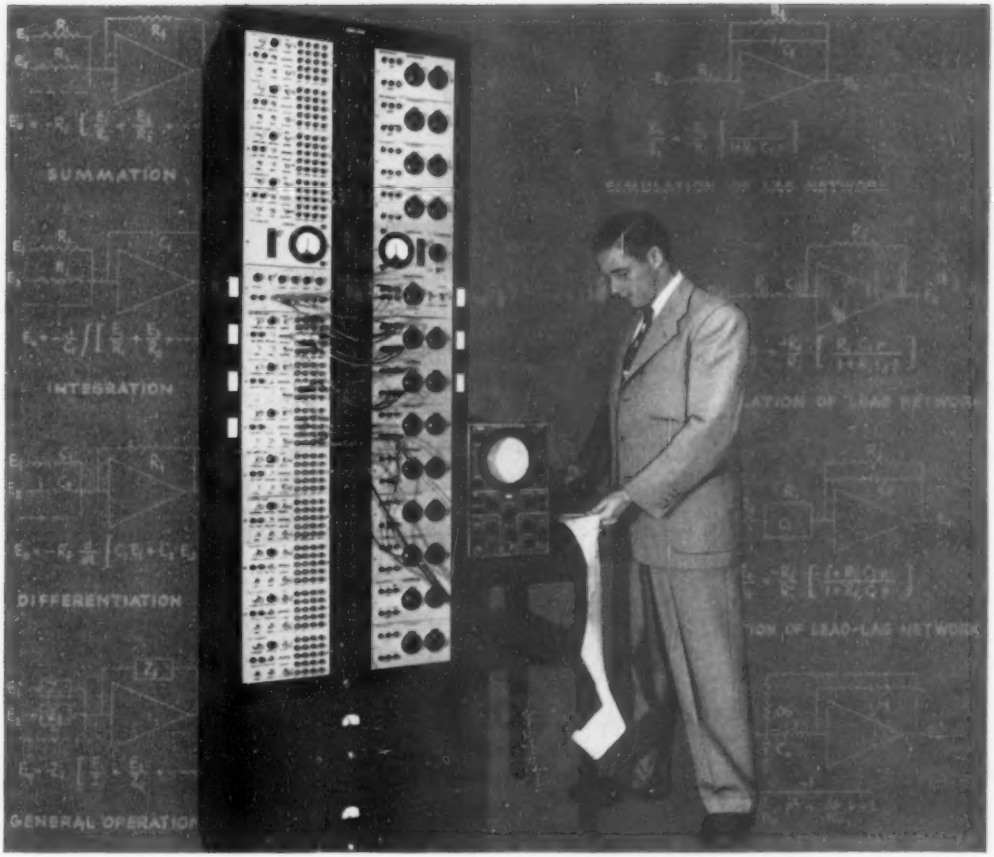

Solving a dynamics problem with the Boeing Computer; oscilloscope at right shows result.

What's it like to be a Boeing engineer?

Boeing engineers enjoy many advantages – among them the finest research facilities in the industry. These include such advanced aids as the Boeing-designed, Boeing-built Electronic Analog Computer shown above.

This is part of the stimulating background that helps Boeing men maintain the leadership and prestige of an Engineering Division that's been growing steadily for 35 years.

If you measure up to Boeing standards, you can share that prestige. And you'll work with renowned engineers on such vital projects as guided missiles, the still-classified B-52, the record-shattering six-jet B-47, and other outstanding developments.

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You can work in Seattle, in the Pacific Northwest, or in Wichita, Kansas. You will receive a generous moving and travel expense allowance. And as a Boeing engineer, you'll enjoy pay that is good and grows with you.

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Write today to the address below, or use the convenient coupon.

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Dept. E-4
Boeing Airplane Company, Seattle 14, Wash.

Engineering opportunities at Boeing interest me. Please send me further information.

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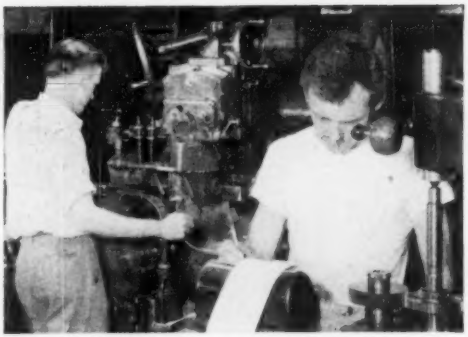
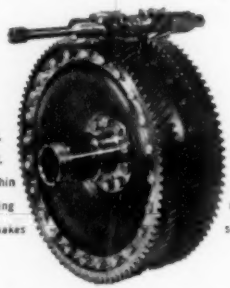


Their business is precision! At Indiana Gear, success or failure is based on vision . . . today's gear problems were solved yesterday and tomorrow's "tough cogs" are on the boards today. It's a hard way to go, but they like it . . . because they fought their way to the top of a highly competitive business with master craftsmen, fine equipment, skilled sub-contractors and "young men of vision."

INDIANA GEAR



The thin steel ring gears, shown in this helicopter reduction transmission set, are over 12" in diameter and are maintained round and true within .001" full indicator reading through carburizing, hardening and tempering. This absolute metallurgical control makes subsequent tooth grinding unnecessary.

INDIANA GEAR WORKS · INDIANAPOLIS 7, INDIANA

Convair Proposes 60-Seat 340 Aircoach

- **Additional passengers could ride in cargo area.**
- **New seating would cost only 4% more, firm says.**

By F. Lee Moore

In a new Convair-Liner cost study, Convair proposes that airlines buy a 60-passenger coach version of the twin-engine 340 for only $20,000 more than the standard 44-passenger 340. Thus, at the presently quoted price per Convair-Liner of $600,000 (including cost escalation), an airline can buy 36% more carrying capacity for only 4% more money.

At a coach fare of 4½ cents a mile on a 600-mi. route like New York-Chicago, the break-even load factor on such a plane would be 44½% (26.7 passengers), according to the Convair figures. Even at the current low night aircoach fares of 4 cents a mile on a relatively high-cost shorthaul 200-mi. trip the break-even load factor would be 58% (34.7 passengers).

Convair bases its direct operating cost of $139.39 per aircraft hour on 8 hr. utilization per day; block speeds are estimated at from 207 mph. for 200 mi. to 239 mph. for 600 mi. and 249 mph. for 1,000 mi. Overhead cost is taken at 106% of the average for all domestic trunk lines for the 12 months ended Sept. 30, 1951.

At the newly certificated gross weight of 46,725 lb., the proposed coach Convair could carry from 52 to 60 passengers with baggage, depending on trip length and amount of baggage carried. If certificated gross weight were increased to 47,000 lb., and Convair says it can be for an extra $5,000 per plane, then it could carry 60 passengers 520 mi.

► **How It's Done**—Convair says that the fuselage will accommodate the extra load of 16 more passengers if the additional seats are installed in the cargo space. Non-structural partitions would be removed. The buffet would be replaced with a smaller one, which would be moved up front. The standard arrangement of the 44 seats already installed would not be changed. Thus, leg room would be the same as on standard Convair.

Baggage would be stowed in the belly compartment and in the overhead racks.

Convair Coach Economics

(60-Passenger Version)

TRIP DISTANCE	NUMBER OF PASSENGERS AND PERCENT CAPACITY NEEDED TO MAKE FLIGHT BREAK EVEN AT: 4½ CENTS A MILE	4 CENTS A MILE	3½ CENTS A MILE
200 Miles	31 (51%)	35 (58%)	40 (66%)
400	28 (46%)	31 (52%)	36 (60%)
600	27 (45%)	30 (50%)	34 (57%)
800	26 (43%)	29 (49%)	33 (56%)

Convair bases these cost estimates on: Direct operating cost per hour of $139.39; overhead at 106% of airline average, 12 mo. to November, 1951.

Convair Coach Costs

TRIP LENGTH	BLOCK SPEED	DIRECT COST PER MILE	TOTAL COST PER MILE
200 Miles	207 mph.	$67.34	$138.72
400	230 mph.	60.60	124.84
600	239 mph.	58.32	120.14
800	245 mph.	56.89	117.19

SOURCE: Convair, Cost Study, Convair 340, 52-60 Passenger Coach.

The upper limit on passenger capacity would be determined on the basis of baggage weight. If Convair coach passengers carried the average 30 lb. of baggage experienced in the U. S., the upper limit would be 56 passengers—at present gross takeoff weight certification for the plane.

But, notes Convair, some West Coast operators report average baggage weights as low as 18 lb. In that case, the plane could take off with 60 passengers, even at the present limit on gross weight.

Trip length is the determining factor of the load, then, since average baggage weight increases with trip distance.

► **Design Study**—The Convair studies of a coach Convair-Liner have not gone far enough yet to show whether the proposed seating would upset the plane's longitudinal balance. But, says Convair, "there is every reason to believe that it would remain satisfactory in a fully loaded condition." There might be some seating restrictions when the airplane is partly loaded.

The plane's empty weight would be about the same for the coach as the standard version, except for the 400 lb. for more seats. Removal of partitions and reduction in buffet weight would about offset the additional soundproofing, wainscoting, hatracks and windows required.

► **Cost Conclusions**—Here's Convair's summary of the economics of a 340 coach. These figures are based on a 52-passenger version (60-passenger statistics are shown in table).

- **Fare 4½ cents a mi.** Break-even point: 30.7 passengers on a 200-mi. flight, 27.6 for 400 mi. and 26.6 for 600 mi. (There's no practical difference in break-even cost for the 60- and 52-passenger versions, since additional cost for the 8 seats is one-half cent a plane mile.)
- **Fare 4 cents a mi.** Break-even point: 34.6 passengers for 200 mi., 31.1 for 400 mi. and 29.9 for 600 mi.
- **Fare 3½ cents.** Break-even point: 39.5 passengers at 200 mi., 35.5 at 400 mi. and 34.2 at 600 mi. (The Los Angeles-San Francisco coach fare of California Central, TWA, United, and Western is 3.45 cents a mi.; the distance is 340 mi.; so break-even load factor in this run would be about 53% or 32 passengers, according to the Convair figures.)

► **Greater Weight**—If the gross weight

62-Seat Convair

(McGraw-Hill World News)

Bogota – Avianca, Colombian airline, is considering possibility of replacing its DC-4 fleet with 62-passenger arrangement Convairs. The company estimates it can exchange one DC-4 for one Convair.

Difficulty of the project is finance. The Convairs have to be paid six months in advance and the DC-4s can be sold only after delivery of the new planes.

Avianca has made a careful study of airports now served by its DC-4s, and says new surface treatment of runways may be necessary when and if the company switches to Convairs.

certification were increased to total 47,000 lb., the coach version Convair could carry 60 passengers (at 195 lb. each, including 30-lb. baggage allowance) to 520 mi.; it could carry 56 passengers 720 mi.; or it could carry 52 passengers 930 mi., with fuel reserve 1,500 lb., cruising speed 267 mph. and cruising altitude 16,000 ft.

Panagra Dispute To Appellate Court

The legal controversy of W. R. Grace and Pan American for management control of jointly owned Pan American-Grace Airways has moved up to the New York Appellate Court after a lower court upheld Grace. Grace seeks to compel Pan American to arbitrate their differences over management of Panagra, as provided in their management agreement. Pan American wants the court to stay the Grace move to arbitrate. Argument is slated this week before the court.

At the behest of the court, both carriers have asked Civil Aeronautics Board to delay its Panagra management proceeding pending decision of the arbitration issue.

In the CAB proceeding, Pan American seeks to have CAB approve an amendment of the Panagra management agreement–to divest Grace of its alleged dominance of management of jointly-owned Panagra.

► **The Issue**–The present management agreement signed by the two companies gives Grace the right to pick the Panagra president–with Pan American approval. If PanAm becomes dissatisfied with the Grace-selected management, the agreement calls for arbitration.

That's why Grace wants arbitration now–because PanAm contested actions of Panagra President Andrew Shea during the Balboa interchange fracas with National Airlines last year. But PanAm says the management agreement provides that PanAm must call for arbitration under such circumstance–not Grace. And Pan American wants to carry the matter to CAB instead of arbitration.

CAB started the Panagra management investigation last September to find out if either Grace or PanAm had increased its control over Grace.

Philippine Air Lines Has Record Year

(McGraw-Hill World News)

Manila–The government-controlled but privately managed Philippine Air Lines closed its books for 1951 with a record $1,445,878 profit after taxes compared with $354,789 profit in 1950 and large deficits in the preceding year. Latest net earnings represented 9.26% of total revenues and 24% of paid-in capital.

PAL's overall load factor was up to 80% last year compared with 1950's 68%.

The carrier has immediate expansion plans for an additional weekly flight to and from London and inauguration of a service to Switzerland and Germany in mid-1952. A Philippine-Swiss air agreement signed in Manila will permit PAL to include stops at Zurich or Geneva in its London service. The company is now seeking permission to operate between Wake Island and Tokyo.

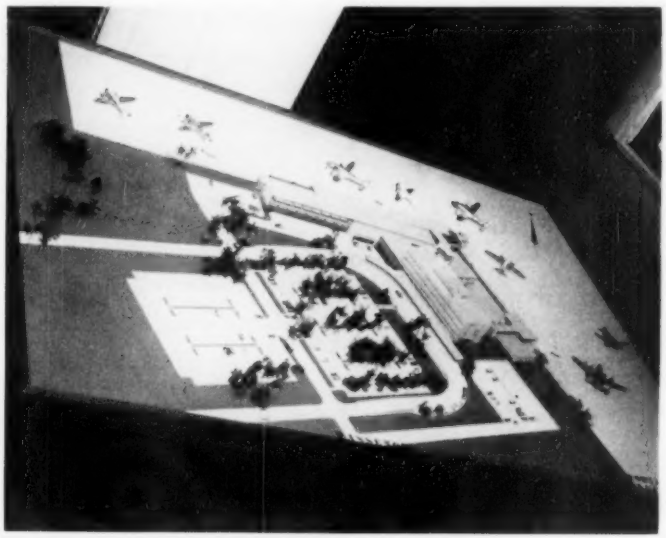
Philippine Air Lines is expecting delivery of two DC-6Bs this year.

Safety Commission Inspects Airports

The President's National (Doolittle) Airport Commission last week made an aerial tour of major "problem" airports. Aim of the tour was to make an on-the-spot evaluation of each airport's commercial and defense importance, as weighed against its "nuisance" or hazard to local residents.

Commission itinerary included visits to civil and military airports at Atlanta, New Orleans, Ft. Worth, Dallas, San Diego, Los Angeles, San Francisco, Colorado Springs, Denver, Kansas City, St. Louis and Chicago.

Aboard the deluxe Air Force Connie for the survey were Commission Members Gen. James M. Doolittle (chairman); Dr. Jerome C. Hunsaker, head of the MIT Department of Aeronautical Engineering; Charles F. Horne, CAA administrator; S. Paul



SAN JUAN TERMINAL UNDERWAY

Symbol of San Juan's increasing importance in the Western Hemisphere transport picture is this photo showing model of the Isla Verde International Airport now under construction. Port is designed to handle a traffic load of 969,000 passengers by 1970. Air passenger movements in Puerto Rico during 1951 numbered 439,634 at Isla Grande Airport. The main runway on the new field pictured will be 7,500 ft. long and 200 ft. wide. Isla Verde is scheduled to be in operation early in 1954.

What Mail Rate For International Carriers?

The Post Office Department wants the compensatory mail pay for international carriers based on cost plus a reasonable profit. The PO opposes the provision of Senate-passed legislation which would set the Universal Postal Union Rate of $2.86 a ton mile as the compensatory rate. This table, submitted by PO to the House Interstate and Foreign Commerce Committee, compares pay to carriers under the different systems. The figures reflect international mail pay only.

	ACTUAL MAIL PAY FOR 1950	WHAT PAY WOULD HAVE BEEN AT UPU RATE	WHAT PAY WOULD HAVE BEEN AT COST RATE
		(000 omitted)	
American	$93	$362	853
American Overseas	2,981	3,282	1,201
Chicago and Southern	1,515	86	30
Colonial	315	16	7
National	54	39	8
Panagra	2,604	1,096	399
Trans-World	9,070	8,521	2,864
Pan American—LAD	4,582	5,249	1,210
Pan American—Pacific	744	10,743	3,114
Pan American—Other	10,735	9,235	3,694
Braniff	1,700	174	74
Northwest	3,128	4,207	994
TOTAL	$37,521	$42,920	$13,648

Johnson (executive secretary) director of the Institute of the Aeronautical Sciences, and Capt. W. P. Cogswell, USN, and Col. Ross Milton, USAF (military advisors to the Commission). Also aboard were representatives of aviation agencies such as CAA and NACA. Horne was to leave the group at San Francisco to make inspections at Honolulu, Seattle, Portland and Spokane.

Pacific Airways Figure Convicted

(*McGraw-Hill World News*)

Manila—William H. Quasha, an American lawyer practising in the Philippines, has been convicted by the Manila Court of First Instance of falsification of public and commercial documents in connection with incorporation of Pacific Airways Corp. in 1946.

The lawyer specifically was charged with having falsified the article of incorporation of the airline so that his Filipino houseboy appeared to have subscribed to 60% of the carrier's stock. The court charged that the houseboy was a dummy utilized to circumvent a law that public utilities operating in the Philippines must be at least 60% beneficially owned by Filipinos.

Quasha pleaded that the "parity amendment" to the Philippine Constitution, passed after the airline was incorporated, which placed Americans on par with Filipinos in the exploitation of natural resources, purged his alleged infraction of the law.

He has appealed the sentence.

Angular accelerometers are made by Statham Laboratories for measurement in ranges as low as ±1.5 radians per second per second.

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Four Airlines List Executive Salaries

Airline executives' incomes reported to CAB for 1951 show that:

- **Robert W. Prescott,** Flying Tiger Line president, had a salary increase from $18,750 in 1950 to $30,000 in 1951, but an $18,000 bonus was paid him in 1950 and none in 1951.
- **George Gardner,** Northeast president, was raised from $18,000 in 1950 to $25,000, plus $5,000 bonus in 1951.
- **J. W. Miller,** Mid-Continent president, went up from $26,766 to $28,700.
- **J. H. Connelly,** Southwest Airways president, increased from $10,333 to $15,000.

Details including present stock holdings of all executives of those three airlines, as reported to CAB:

▶ **Northeast Airlines, Inc.**—Paul F. Collins, chairman of the board, no salary, no bonus, 1,000 common shares (no 1950 report); George E. Gardner, president and director, salary $25,000, bonus $5,000 and 10,000 common shares ($18,000 salary); A. A. Lane, vice president—operations, salary $14,400, no bonus and 10 common shares ($14,400 salary); R. L. Turner, vice president—sales, salary $12,000, bonus $2,000 and no stock ($8,000 salary); Hamilton Heard, treasurer, salary $15,000, no bonus, no stock ($12,000 salary); R. H. Herrnstein, assistant treasurer, salary $4,550 (sic), no bonus, no stock ($7,500 salary); H. E. Foley, clerk, no salary, no bonus, 500 common shares (no 1950 report); and the following directors: A. C. McMenimin, 300 common shares; J. F. Fitzgerald, 500 common shares and Eugene L. Vidal, 14,000 common shares (no 1950 reports on these directors).

▶ **Flying Tiger Line, Inc.**—Robert W. Prescott, director and president, salary $30,000, no bonus, stock holdings of 15,928 common and 3 preferred ($18,750, bonus of 18,000 and 23,780 common shares); Samuel B. Mosher, chairman of the board, salary $1,200, no bonus and stock holding of 27,970 common and 818 preferred (no salary, no bonus and 26,115 common shares); Fred Benninger, secretary-treasurer, salary $18,000, no bonus and no stock ($12,396, bonus of $16,000 and no stock); W. E. Bartling, vice president, salary $10,700, no bonus, 12,488 common shares and 570 preferred shares (salary $7,450, bonus $9,600 and 11,372 common shares); George T. Cussen, vice president, salary $8,000, no bonus, 200 common shares and 33 preferred shares ($7,475, bonus of $2,500 and 100 common shares); Ralph B. Stump, assistant secretary-treasurer salary $9,400, no bonus and no stock (no 1950 report); Norman L. Meyers, assistant secretary, no salary, no bonus, 3,050 common shares and 82 preferred shares (no salary, no bonus and 400 common shares); and the following directors: Allen T. Chase, salary $4,318, no bonus and 12,194 common shares (no salary, no bonus and 20,900 common shares); James E. Davidson, salary $1,350, no bonus and no stock (no salary, no bonus and 15,120 common shares); Harlan B. Eldred, salary $4,050, no bonus, 2,100 common shares and 346 preferred shares (salary $1,800, no bonus and 800 common shares); Houston Rehrig, salary $4,500, no bonus, 15,730 common shares and 2,700 preferred shares (no salary, no bonus and 7,450 common shares); and T. J. Sullivan, salary $4,350, no bonus, 13,980 common shares and 2,300 preferred shares (salary $1,800, no bonus and 15,218 common shares).

▶ **Mid-Continent Airlines, Inc.**—Thomas F. Ryan III, chairman of the board, no salary, employes' stock purchase plan 500 and stock holdings of 79,998 common shares (no 1950 report); J. W. Miller, president and director, salary 28,700, stock purchase plan 2,345 and 1,808 common shares ($26,768 no bonus, no stock); John A. Cunningham, vice president-operations, salary, $15,600, stock plan 627 and 450 common shares ($14,100 no bonus, no stock); Hugh W. Coburn, vice president—traffic and sales, salary $13,600, stock plan 813 and 640 common shares ($12,099, no stock, no bonus); C. H. Calhoun, vice president-maintenance and engineering, salary $13,600, stock plan 432 and 328 common shares ($12,099, no bonus, no stock); W. L. Walker, treasurer, salary, $11,400, stock purchase plan 373 and 260 common shares ($9,900, no bonus, no stock); P. H. Carr, secretary, salary $6,791, stock plan 254 and 200 common shares ($5,450, no stock, no bonus); W. D. King, assistant treasurer, salary $6,900, stock plan 127 and 100 common shares ($6,350, no bonus, no stock); Mary C. Oliver, assistant secretary, salary $3,539, no bonus, no stock (no 1950 report) and the following directors: John H. Haffer, no salary, director's fee $300 and 19,900 common shares; Sidney F. Brody, no salary, fee $400, no stock; J. C. Collins, salary $4,800, fee $804 and 610 common shares (salary $9,633); E. C. Eppley, no salary, fee $200 and 5,500 common shares; W. W. Howes, no salary, fee $600 and 2,000 common shares; T. N. Law, no salary, fee $600 and no stock; Milton McGreevy, no salary, fee $5,500 and 100 common shares; Ryal Miller, no salary, fee $400 and 1,000 common shares; G. D. Murdoch, no salary, fee $5,600 and 2,100 common shares; V. F. Rotering, no salary, fee $200 and 200 common shares, and Jan H. Tillisch, no salary, fee $400 and 200 common shares. (no 1950 report was given for the directors).

▶ **Southwest Airways, Inc.**—Leland Hayward, chairman of the board, no salary, no bonus, holdings of 143,988 common shares (no salary, no bonus, 143,988 common); J. H. Connelly, president and director, salary $15,000, no bonus, 148,252 common shares ($10,333 and 148,252 common shares); T. R. Mitchell, vice president, salary $12,000, no bonus, 260 common shares ($11,335 and 260 common); A. W. Johnson, treasurer and director, salary $11,400, no bonus and 3,000 common shares ($10,400, no bonus and 3,000 common); Walter Roche, secretary and director, no salary, no bonus and 716 common shares (no salary, no bonus and 716 common); C. H. Sullivan, assistant secretary and counsel, salary $2,800, no bonus and 5,500 common shares ($8,400, no bonus and 1,600 shares); Floyd L. Henderson, director and assistant secretary, no salary, no bonus and 4,290 common shares (no salary, no bonus and 4,290 common); and the following directors: Bert Allenberg, 10,400 common shares, (10,400), Daniel T. O'Shea, 2,678 common shares, (2,678) and Harry White, salary $8,400 and 20,254 common shares ($2,687 and 20,254 shares).

Political Action Needed, AAAE Hears

There is a clear-cut need for U.S. airport executives to become politically educated and make their voices heard in Washington if the airport situation in this country is going to get the same understanding given to other business groups, Walter E. Betsworth, president of the American Assn. of Airport Executives claims.

Speaking at a recent meeting of the AAAE in Fort Worth, Betsworth noted that very few of the legislators who helped write the Federal Airport Aid Act remain in Congress and there must be a concerted effort to establish new friends in Washington who will work to protect airports from cutbacks, budget slashes and burdensome taxation.

SHORTLINES

▶ **American Airlines** has DPA certification of rapid amortization of 80% of the value of 17 new Douglas DC-6Bs, estimated at $18,908,280, including spart parts.

▶ **British Overseas Airways** has set the date for inauguration of scheduled jet airline service as May 2, when a BOAC Comet starts London-Rome-Johannesburg passenger service. Schedules step up from one England-South Africa round trip a week in May to three in June.

▶ **British European Airways** says it will adopt the Decca flight log navigation system, subject to satisfactory contract agreement, because BEA says it "offers promise of the best solution to its European navigation problems." (The U. S. and a majority of other countries with airlines have chosen the VOR-DME system as superior to the British Decca system.)

▶ **Eastern Air Lines** has DPA certification for rapid amortization on 80% of the value of its fleet of Super Constellations and Martin 4-0-4s—$74,125,731.

▶ **Flying Tiger Line** is launching a $100,000 advertising campaign in a series of seven ads to run in leading business journals this spring.

▶ **House Aviation Subcommittee** (of the Interstate and Foreign Commerce Committee) ultimately will come out with a general report recommending civil air transport safety improvements. Scope of report won't be limited to Newark Airport, or airport safety generally.

▶ **International Air Transport Assn.** reports a 23% gain in IATA clearing house transactions this Jan. over a year ago—to $15,706,000.

▶ **Military Air Transport Service** last week started making tests of life rafts, Mae Wests, anti-exposure suits, and survival kits in the Gulf of Mexico, operating out of Eglin Field. CAA has been invited to participate.

▶ **National Air Transport Co-ordinating Committee** Chairman E. V. Rickenbacker has urged a N. J. joint legislative committee to support immediate re-opening of Newark Airport, with operations limited to fair weather until the new instrument runway is completed in Nov.

▶ **National Airlines** reports a 10% gain

in traffic this Feb. over a year ago, with coach service up 32%.

▶ **New York Airways** is assembling estimates of Post Office's "lift requirements" for metropolitan N. Y. mail service by copter—estimated pounds per day, points involved and hours. That will affect NYA's decision on whether to shoot for small Sikorsky 52 or Bell 47 copters, or start with the larger S 55.

▶ **Northwest Airlines** load factor in Feb. was 55%, compared with 50% a year ago. Passenger miles were up 47% to 39,834,357.

▶ **Pan American World Airways** is under CAB investigation for alleged furnishing of free transportation to unauthorized persons. Ferry flights to maintenance base, plus publicity expenses and other "services rendered" ticket charges are cited.

▶ **Philippine Air Lines** Orient-bound U. S. passenger traffic gained 26% over a year ago this Jan. and Feb.; cargo gained 33%.

▶ **Pioneer Air Lines** dependence on mail pay was down to 30% in 1951, compared with 40% in 1950, 51% in 1949. Cost per mile of DC-3 operation was up to 86 cents from 81 cents in 1950; but higher volume brought operating cost per ton-mile from 73 cents down to 62 cents. . . . Traffic gains over a year ago were 15% and 12% in Jan. and Feb., respectively.

▶ **Port of N. Y. Authority** is implementing part of a $5-million expansion program for Idlewild Airport. Bids on taxiway and other improvements to convert Runway D to night operation in line with the new preferential runway policy will be considered by the Authority commissioners Apr. 10.

▶ **Robin Airlines** is under a CAB show-cause order for revocation of its letter of registration for alleged knowing and wilful violations involving stock transfer.

▶ **Robinson Airlines** reports its traffic increased 51% in 1951 to 1,495,934 passenger miles.

▶ **Sabena Belgian Airlines** has CAA certification for all major and minor repairs and maintenance of U. S.-registered planes.

▶ **Seaboard & Western Airlines** reports that a recent S & W DC-4 delivery of military equipment under the MDAP program was the first commercial U. S. traffic flight into postwar Yugoslavia.

▶ **Trans-Canada Air Lines** passenger traffic increased 15% to 950,000 persons carried, and cargo gained 15% to 5,200,000 ton-miles in 1951.

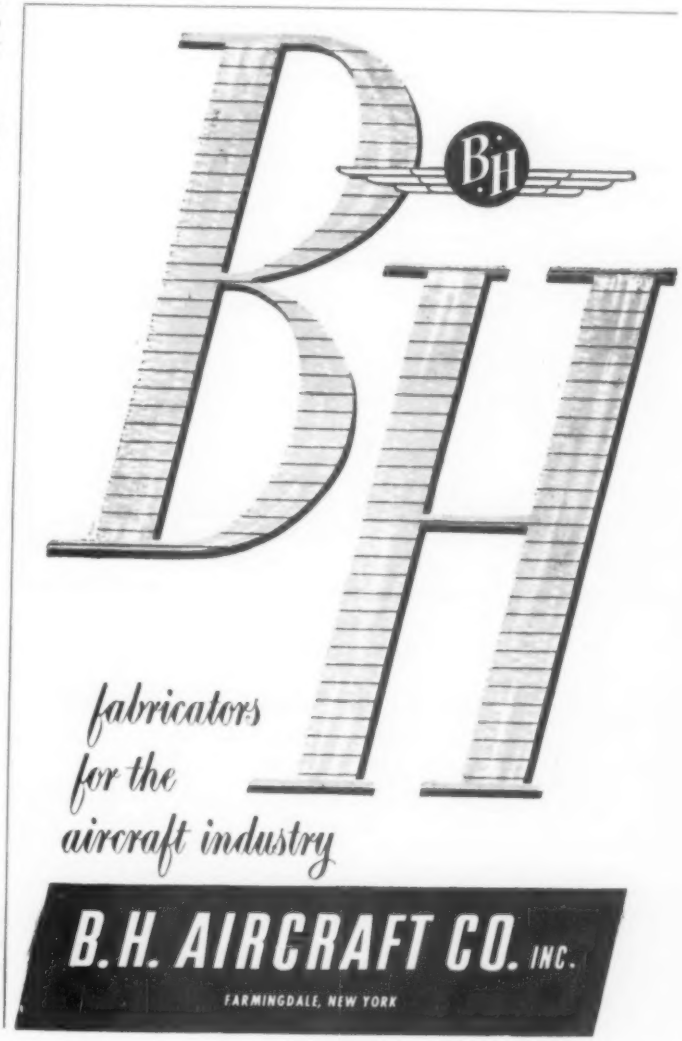
▶ **Trans World Airlines** has decided to increase its 60-passenger trans-Atlantic Constellation air coach service to 10 flights a week June 1 from seven weekly in May due to heavy advance bookings. . . . Offers package all-expense two-week tours to England and France for $656.

▶ **U. S. Airlines** carried 1,275,133 ton-miles cargo in Feb.

▶ **United Air Lines** has increased its 1952 advertising budget 30% over 1951—newspapers 29%, television 38%, magazines 55%.

▶ **United Kingdom** reports a 28% gain in passenger and 38% gain in air freight movement through U. K. and Channel airports in January over a year ago.

▶ **Western Air Lines** has final CAB approval for dissolution of Inland Air Lines, wholly owned subsidiary. Member Josh Lee dissented on grounds Western's place in the national route pattern is not settled and there has been no CAB decision on Western's Salt Lake City-Casper route application—the missing link in Western's system.



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BTV-2 GARGOYLE GUIDED MISSILE

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New and expanding division of an established firm with 20 years of successful experience in the instrument field. Work involved deals with the manufacture and development of highly complex equipment of the most advanced type.

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Three years' experience—jet engine analysis, design and test background.

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Careers are being built on the solid foundation of
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When there are many applicants it frequently happens that the only letters acknowledged are those of promising candidates. Others do not receive the slightest indication that their letters have even been received, much less given any consideration. These men often become discouraged, will not respond to future advertisements and sometimes even question if they are bona fide.

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Total Hours to February 21, 1952

Airframe 2665
R/H Engine 585
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P&W R1830-92 Engines
6477A-O (Paddle) Propellers

RADIO EQUIPMENT:

2 Bendix MN62 ADFs, 1 each: Bendix RA10 Range Receiver, Bendix MN53 Marker Receiver, RTA1B 50-watt MF Transceiver, ARC 3 VHF Transceiver, ARC Tunable VHF Receiver, Collins 17L Transmitter, Collins 51R2 Omni & Localizer Receiver, Collins 51V Glide-slope Receiver.

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R1830-92 Engine, 6477A-O Propeller, Miscellaneous Accessories, and Instruments.

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3 have curtains
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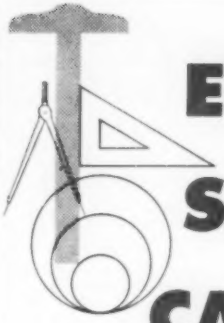

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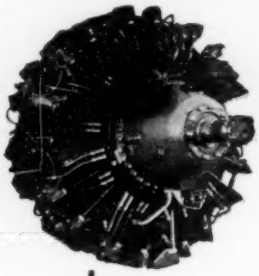

R-2800's 31⁵-51⁵-75⁵

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TWO EXECUTIVE AIRCRAFT

DC-3 NOW IN CONVERSION **C-47**

BEAT RAIL AND AIRLINE SCHEDULES WITH

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New PWR 1830-75 Engines
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Speed 260 mph (T.A.S.) - Range 1500 Mi.

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AY203 & AY205 Autosyn Motors
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AN525 WASHER HEAD SCREWS

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132,000	AN525-8-6	196,000	AN525-10-14
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1,019,000	AN525-10-8	536,000	AN525-416-12
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PLUS MANY OTHERS

43 PIECES

ENGINE QUICK CHANGE UNITS APPLICABLE TO GRUMMAN FM-1 AIRCRAFT. COMPLETE WITH ACCESSORIES

MISCELLANEOUS COMPONENTS

Quantity	Part No.	Mfg.	Description
45	AN4103-2	Clifford	Brass (Valve #U4785) Oil Cooler
38	18597-2	Airsearch	Aluminum Oil Cooler
120	MF9-713-13A	Vickers	Hydraulic Pump
700	TFD 8600	Thompson	Fuel Booster Pump
195	D7818	Adel	Anti-icer Pump
50	9P771-A	Pesco	Fuel Booster Pump
250	AN4014	Erie Meter	Wobble (D-3) Pump
300	1H260-K & KA	Pesco	Hydraulic Pump
19	AN5531-1	G. E.	Tach. Generator
1000	AN5780-2	G. E.	Wheel & Flap Position Indicator
400	AN5780-2	Weston	Wheel & Flap Position Indicator
16	76B19	Lewis Eng.	Cyl. Head Temp. Gauge
10	4682	Lewis Eng.	Air Temp. Ind.
31	47B21	Lewis Eng.	Temperature Ind.
12	47B22	Lewis Eng.	Temperature Ind.
20	47B23	Lewis Eng.	Temperature Ind.
36	47B24	Lewis Eng.	Temperature Ind.
10	76Z2	Lewis Eng.	Air Temp. Ind.
11	76B4	Lewis Eng.	Temperature Ind.
20	77C4	Lewis Eng.	Temperature Ind.
21	77C5	Lewis Eng.	Temperature Ind.
85	787Y79Z2	Weston	Left Wing Anti-icing
88	787Y73Z2	Weston	Right Wing Anti-icing
83	787Y74Z2	Weston	Tail Anti-icing
11	2227-11D-3A	Eclipse	Dual Tachometer
44	5BA25DJ4B	G. E.	DC Motor (½ HP)
83	A4934	Delco	Motor
50	RDB2220	Holtzer Cabot	DC Motor
115	P4CA8A	Parker	Primer
70	AN3213-1	Scintilla	Ignition Switch
450	A-9 (94-32996)	Nasco	Ignition Switch
687	R5-2	Mallory	Selector Box
90	JH950-R	Jack & Heintz	Starter Motor
492	S-841 (94-32253)	Electronic Labs	Box
53	AN6203-3	Bendix	Accumulator 10"-1500 P.S.I.
1000	13018-A	Bendix	Interphone Box
140	K14949E	Marquette	Windshield Wiper Kit
188	EYLC-2334	Barber-Colman	Control
11	12086-1C	Eclipse	Amplifier
174	450-0	Skinner	Gasoline Filter
250	558-1A	Eclipse	Oil Separator
100	716-3A	Eclipse	Generator (NEA-3A)
37	117-47	Edison	Detector
89	318	Edwards	Horn
20	794-F	Stewart Warner	Heater
230	921-B	Stewart-Warner	Heater (200000 BTU)
340	981280	Kidde	Co2 Cylinder
85	12924-2	Adel	Lock Valve
90	983748	Kidde	Oxygen Cylinder
80	DW28	Eclipse	Transformer
97	6041H-146A	Cutler Hammer	Relay (B-12)
22	0655-D	Aro	Oxygen Regulator
148	PG208AS1	Minn. Honeywell	Air Ramp Switch
33	DW47	Eclipse	Transformer
11	DW33	Eclipse	Transformer
65	ASDC2	CO2 Mfg. Co.	Fire Detector
600	ND21	American Gas Accumulator Co.	Time Delay Relay
30	U6005-DV5	United Air Prod.	Oil Temp. Reg. 5°
29	UA-3160	United Air Prod.	Oil Temp. Reg. 6°
95	UA-3160C	United Air Prod.	Oil Temp. Reg. 6°
73	UA-6001-CF-DV5	United Air Prod.	Oil Temp. Reg. 7°
14	UA-6009-S-30	United Air Prod.	Oil Temp. Reg. 9°
11	UA-6012K-S30K	United Air Prod.	Oil Temp. Reg. 12°

CARBURETORS! MAGNETOS! SPARK PLUGS!

Quantity	Part No.	Description
247	PD12K10	Stromberg injection Carburetor
19	1375F	Holley carburetor
407	SF9LN-2 (manufacturer's part No. 10-12453-6 Spec. AN9511)	Bendix Scintilla Magneto
42	SF5RN-12 (manufacturer's part No. 10-26170-1)	Bendix Scintilla Magneto
185,000	LS4AD1	Spark Plug (Aero)
30,000	LS-6S9A	Bendix Scintilla Spark Plug

SPECIAL GROUP!

Ideal for tear-down for parts

Quantity	Part No.	Description
328	PD12K10	Stromberg injection carburetor
236	PR48-A1	Stromberg carburetor
29	PR48-A2	Stromberg carburetor
31	PR48-A3	Stromberg carburetor

PRATT AND WHITNEY AIRCRAFT ENGINE PARTS

Quantity	Part No.	Description
166	1045A	Bearing
500	3506	Flange
130	8288	Follower Ass'y
814	35814	Blower Ass'y
53	48368	Shaft
175	48363	Shaft
56	48398	Sump
390	48461	Gear
78	76236	Gear
1178	84289	Bearing
113	84487	Housing
77	84591C	Nose Housing
200	48350-D	Crankcase Ass'y
200	84083	Cylinder
100	84084	Cylinder
200	84085	Cylinder

HUGE STOCKS OF ALL TYPES *AN* HARDWARE NEW — UNUSED. WRITE FOR DETAILED LISTINGS.

BEARINGS AIRCRAFT

Quantity	Part No.
18000	K3L-2
8600	K3L-R48
4000	KF4
3000	KF4H
30000	KP4R16-2
3300	KSF5
17000	BC5W11
28000	KS6A
7000	38KD4
6600	RE3MR3
5000	F35-14

ACTUATORS

Quantity	Part No.
42	400AJ3
161	420 EC
160	420 DY
12	M-2031 (Air Associates)

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QAIEN QIPEN QURUB 22. In language such as this, information concerning the condition of aeronautical facilities is given to the pilot. It is called a NOTAM (Notice to Airmen) and is written in "Q code." Woe to the pilot who does not have a decoding dictionary and time to use it. This particular group of hieroglyphics informs him that the ILS and approach lights are not operating and runway 22 is closed.

Instrument flight depends primarily on radio facilities. It therefore follows that a pilot must know beforehand that the aids he intends to use are in proper operating condition. If they are not the flight may be inadvisable. **Information of this sort must be up-to-the-minute, easily understood and readily available.**

►**Big Job**—Under the heading of NOTAMS comes data on airports, runways, radios, lights and many other things. The CAA is charged with collecting and distributing this information and constant, everyday change in status of our thousands of aeronautical facilities make this job one of the biggest in aviation. It is a credit to all concerned in CAA that they are able to do it at all.

But it is unfortunate that we must say that much of this splendid effort is wasted. Information simply does not get to the pilot the way it should.

Primary sources of NOTAMS for the pilot is the teletype. It is also the bottleneck because the standard machine prints only 60 words per minute. There are plans afoot to revise the system with new, faster machines. This however, is for the future. Present equipment must be lived with for several years and, more important, must do a satisfactory job.

►**Orderly Sequence Needed**—Currently NOTAMS appear on the teletype either as separate items during lulls in weather sequences or as part of an individual weather report. Is not NOTAM information equally as important? At any airport the pilot can see the weather reports easily and quickly. He needs only to scan an orderly sequence. Why not adopt something similar for NOTAMS? This might help eliminate the many small strips of paper which have been taken from the teletype only to become "lost, straved or stolen."

Since there is time to print them separately on our 60-word-per-minute teletypes there should be time to print them in sequential form. Were this done a pilot might be able to obtain a mental picture of the condition of facilities along his route just as he now obtains a picture of the weather.

►**Complex Code**—The other objection, coding, is a more difficult problem. Obviously present equipment does not allow everything to be printed in plain English—which is always most desirable. Some form of coding is a necessity and pilots may simply have to buckle down and learn it. At the same time it must be made clear that use of the Q code is undesirable. Memorizing is impossible since there are several thousand of these five letter combinations. A less complicated one would be more usable.

Importance of NOTAMS is another feature that has been overlooked. There should be a system of marking those which pertain to hazards to distinguish them from minor items such as an obstruction light that had burned out.

There are, of course, many other facets to this problem; only a few highlights have been touched on here. But under present conditions pilots can and do miss important information. With a few revisions in methods this could be changed into an adequate system.

As it stands now, the pilots say: "They are NO TAM good."

WHAT'S NEW

New Books

Servomechanisms, fifth in a series of selected British Government research reports. His Majesty's Stationery Office, London, price $13.

Covering research work carried out under the auspices of the Ministries of Supply and Aircraft Production (now the Ministry of Supply) the 17 reports in this volume deal with the theory, design and operational factors involved in servomechanism devices.

Theoretical aspects include interpretation of Nyquist diagrams, solution of algebraic equations by graphical methods, evaluation of roots of quartic equations and rapid evaluation of the roots of equations of fifth and sixth degree.

Design portions cover components such as the velodyne, quick response sense detecting rectifier circuits, smoothing and retransmitting mechanisms and aided laying systems.

New Addresses

Aircraft Products Co. has moved its plant and offices to King Manor, Bridgeport, Pa. Telephone is Norristown 5-1000. Former location was Clifton Heights, Pa.

Carl Hirschmann Co., has opened a new branch at 525 E. Michigan St., Milwaukee 2, Wis., to broaden its representation for Swiss lines of precision machine tools. Russell T. Gilman is executive director of the new office and C. J. Sternberg is manager of sales and service. The firm's other offices are in Manhasset, N. Y., and Los Angeles, Calif.

Airtron, Inc., aircraft and electronics components maker, has transferred its administrative offices to larger quarters to 20 E. Elizabeth Ave., Linden, N. J.

Publications Received

- **The Army Air Forces in World War II, Volume III: Europe—Argument to V-E Day (January 1944 to May 1945)**, edited by W. F. Craven & J. L. Cate. The University of Chicago Press, 1951, $8.50.—The third of seven volumes continues the story of the air war in the European and Mediterranean theaters.
- **Main Fleet to Singapore**, by Captain Russell Grenfell, R. N. The Macmillan Co., 60 Fifth Ave., New York, N. Y., 1952, $3.75.—An account of the sinking of HMS Repulse and HMS Prince of Wales by Japanese air power off Malaya.
- **The Fireside Book of Flying Stories**, edited by Paul Jensen, Simon and Schuster, 1230 Sixth Ave., New York, N. Y., 1951, $3.95.—A compendium of exciting fiction and non-fiction covering the entire span of human flight from the first hot-air balloon ascension in 1783 to the present.

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EDITORIAL

Let the Truth Come Out

Now that the two directors of CAA's vitally important Office of Aviation Safety have had their say on this page (last week) about our charges of inefficiency, where do we go next?

First: We will run our detailed comment on their letter shortly.

Second: Let it be emphasized again that our interest is constructive, to improve aviation safety by revealing as many questionable aspects of the Office of Aviation Safety as we can uncover.

Let's not forget as we read such documents as the Hensley-Davis letter that there is frequently a vast void between theory and practice, and the results of each.

Third: Regardless of whether congressional or other groups agree with us, or join in the honest inquiry, we intend to keep the spotlight turned on all corners of OAS.

The Scripps-Howard newspapers' by-words are relevant: Give Light, and the People Will Find Their Own Way.

Fourth: By concentrating mainly on Messrs. E. S. Hensley and William Davis, and their OAS, we do not imply that other sections of CAA or any other government aviation agency are above comment. Why then do we concentrate on OAS?

• Because the recent OAS reorganization, we believe, was demoralizing and conducted in a high-handed manner, and we believe it was a step farther away from efficiency and safety.

• And because the Office of Aviation Safety, unlike other CAA units, is the very nucleus of CAA's safety functions.

If you doubt this, read how OAS's own General Order No. 6 of Oct. 15, 1951, summarizes its functions:

"The functions and responsibilities of the OAS described below apply generally to the examination, certification, inspection, and improvement of: the design, manufacture, and maintenance of aircraft and aircraft components; the competency and physical fitness of airmen; and the flight operations and technical facilities of air carriers, other aircraft operators, airman schools, and other air agencies. For the sake of brevity, these functional areas will usually be referred to as 'the technical regulation and improvement of aviation safety' in the statements which follow. . . ."

Thus, OAS is the very heart and soul of government regulation for air safety. Here of all places we need top men of unquestioned integrity, technical and administrative skill, men who can withstand political and other outside forces, men who can make sound, clear-cut decisions and stick by them, and stand behind everyone else on their staff who does likewise.

It is our opinion that OAS does not have enough men like this, and some of those they have are not high enough up the executive ladder of OAS to get the right things done.

That's the why of this campaign—pure and simple. It is not a mere fight against personalities. But the fire has been directed at the top men in OAS for the very good reason that it is they who hold the responsibility that every executive has—to conduct the organization he heads, and do it well. You can not launch criticism at honest, conscientious men down the line if their bosses will not back them up.

It is our firm conviction that conditions in OAS justify a continued examination in public, by good reporting methods. But we still operate under a disadvantage if those who hold control and have access to all OAS records do not cooperate any better in the future than they have in the past, in answering our questions. All of our questions on this page Mar. 24 still remain unanswered.

Furthermore, we must omit certain concrete information and names, even though they are in our possession, in order to protect individuals from recrimination.

But we believe our readers will understand these handicaps, and want us to do the best we can. Because we are firmly convinced aviation is living in a fool's paradise as long as the OAS setup is as loose and ineffective as we think it is.

We hope to enlighten you about OAS and its top people, their experience and training, their methods, their attitudes, current procedures and practices, with the resulting shortcomings and inadequacies; the gradual replacement or dilution of good engineering brains, or the overlayers of "executives" or "administrators" above those who may be or should be acutely familiar with the day-to-day problems and the innumerable technical changes and progress in aircraft design, operation, maintenance, and engineering; and accident prevention and analysis.

Surely, if they are sincere in their words of last week, Messrs. Hensley and Davis will welcome inquiry, and will want nothing hidden. Let the truth come out. Let the critics be heard. Then let the public and aviation make up its own mind.

Progress!

Always alert for signs of transportation progress, we must give credit to the railroads for an accomplishment in 1951, announced by the Association of American Railroads:

"The average speed of freight trains in 1951 . . . was greater than in any preceding year, amounting to 17 miles per hour for all freight trains operated by Class I railroads. . . .

"A new high record in the average speed of all passenger trains also was reached . . . for both local and through trains, of 37.7 miles per hour, compared with 37.4 miles in 1950 and 36.1 miles in 1941."

Congratulations! —Robert H. Wood

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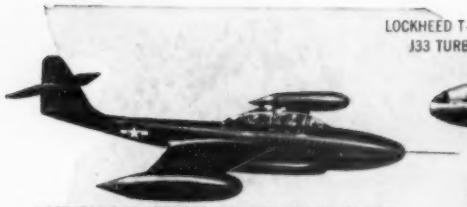

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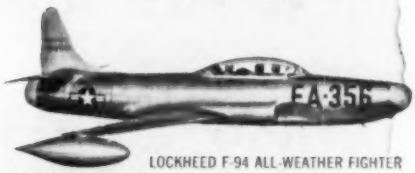

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